

THE ABC OF THE GREENHOUSE

THE ABC OF GARDENING SERIES:—

THE ABC OF GARDENING (KEY VOLUME)

THE ABC OF VEGETABLE GARDENING

THE ABC OF FRUIT GROWING

THE ABC OF THE GREENHOUSE

THE ABC OF FLOWER GROWING

THE ABC OF BULBS AND CORMS

THE ABC OF THE ROCK GARDEN AND POOL

THE ABC OF GARDEN PESTS AND DISEASES

THE ABC OF CLOCHE GARDENING

THE ABC OF FLOWERING SHRUBS

THE A.B.C. OF THE GREENHOUSE

by

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"Who loves a garden, loves a greenhouse too,
Unconscious of a less propitious clime;
There blooms exotic beauty warm and snug."—*Cowper*.

P R E F A C E

THOSE who get bitten with the gardening "bug" are never satisfied until they have a greenhouse. Here they spend hours—often far longer than they need—for glasshouse culture is very fascinating.

To help them with this useful and often profitable hobby I have written this simple book. I hope I have provided what I have been asked to do by many correspondents and that is a guide to the greenhouse both for beginners and for the more experienced.

I am most grateful to Miss M. Walpole, B.Sc. (Hort.), A.R.H.S., Miss Gweneth Wood, Dip. Hort. (Swanley), F.R.H.S., and Miss Maria Dehn, B.Sc. (Hort.), N.D.H. Technical Assistants to the Bureau, for all the work they have done to make this book a success. Captain M. Mason (late of Kew), my Horticultural officer at the No. 2 Horticultural Training Centre, has been most kind in reading the proofs through and making suggestions. I must thank Mr. W. J. C. Lawrence of the John Innes Horticultural Institution for going through the chapter on composts and for making several useful suggestions and alterations. Miss Grace Brydon, B.Sc. (Hort.), corrected the original proof carefully and diligently and my thanks go out to her also.

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Mr. Wright of Messrs. Duncan Tucker (Tottenham) Ltd., Tottenham, gave much help in the chapter on greenhouse

construction and heating. Messrs. Duncan Tucker (Tottenham), Ltd., also kindly lent all the drawings and photographs for the illustration of this chapter. I must also thank Messrs. Suttons for the photographs of "Annuals in Greenhouse." Thanks again!

Mr. Montagu Allwood with his unfailing goodwill helped considerably with the chapter dealing with carnations. My thanks are due to him also. I am thankful to Mr. C. F. Fraser-Smith, who was one of the Bureau's assistants, and as such gave much thought to Chapters II and III and made many useful additions.

Thus did many experts help in the "building-up" of this book. I hope it will prove useful.

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and Advisory Bureau,
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To
MONKTON COMBE SCHOOL

A Public School with a definite Evangelical Christian background.
My "Alma Mater," and where my boys were educated also.
It taught me to write!

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CHAPTER I

THE GROWING OF PLANTS UNDER GLASS

I have a greenhouse, so

1. What plants can I grow in it?
2. Do I have to have a lot of heat?
3. Must I coddle my plants?
4. Can I ensure continuity?
5. Can I hurry crops along?

Most people start gardening without a greenhouse, but before long they find themselves buying one or building one. This urge for a glasshouse is quite natural, for it enables the keen gardener to keep "on the go" the whole year round. The greenhouse is a nice place to work in on a cold day. Plants on benches are a godsend to those who are "getting on," for it saves them bending or kneeling down.

Under glass one is enabled to grow all kinds of plants indigenous to other countries, and to give them the conditions that they would receive in warmer climes. This gives the gardener the chance of increasing the range of plants that he can grow with the result that it gives him a greater interest.

The plants in a glasshouse should be grown in the conditions as near possible to those in which they would be growing normally outside. In the chapters dealing with the plants, care has been taken to give details of watering, temperatures and ventilation, so that the beginner will have no difficulty in giving the conditions necessary.

The glasshouse enables a grower to force plants out of season. In Chapters VIII and IX details are given of how vegetables and fruits may be grown successfully for out of season periods—tomatoes in the spring and autumn, lettuces and French beans in the winter—peaches and nectarines early in the summer—strawberries in the New Year and so on.

'BEAN'

PRECAST CONCRETE DUTCH GLASSHOUSE



COMPLETED

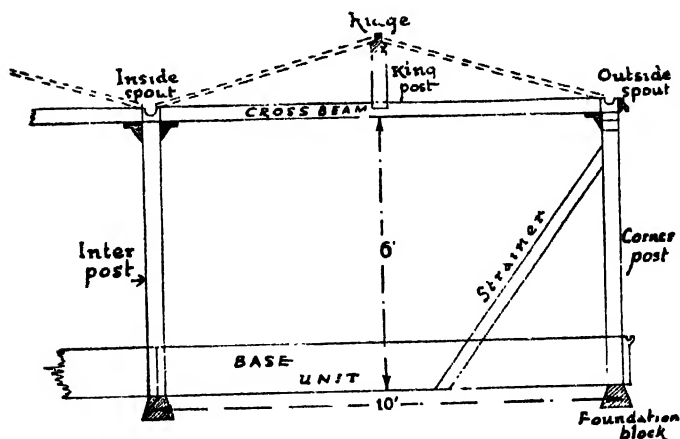
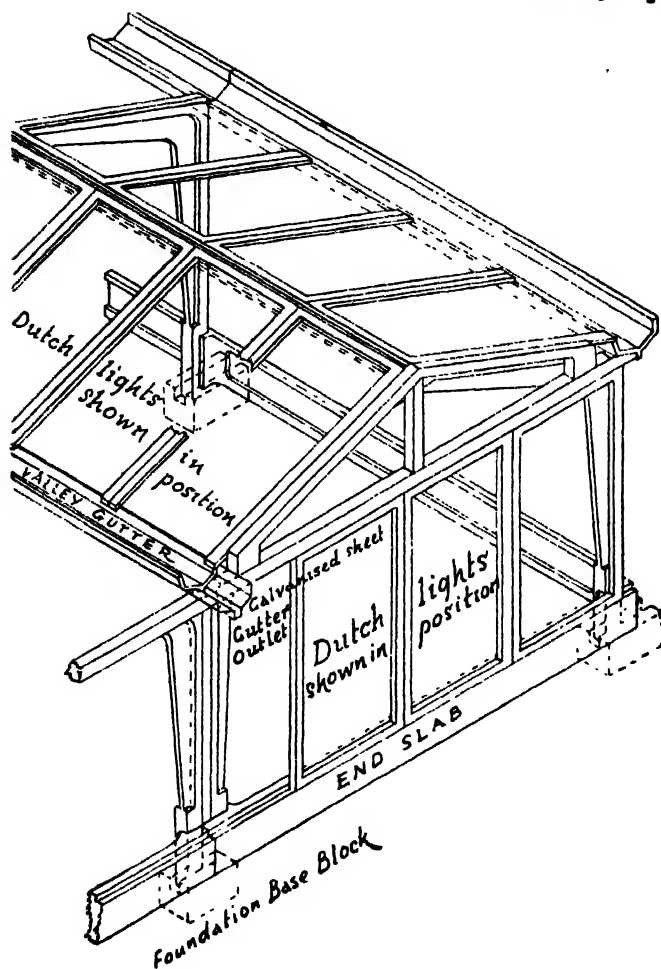


Diagram showing easy method of erection.

ISOMETRIC PROJECTION
EVANSTONE GREEN HOUSE COMPONENT
(Scale $\frac{1}{8}'' = 1'0''$)



The greenhouse is also invaluable for raising plants of a half-hardy character, and directly that the weather is warmer in May and June the plants can be put outside. The result is that much earlier flowering is ensured, and so the gardener gets a much more beautiful garden for a longer period. It would be impossible to grow those 3 lb. and 4 lb. onions without the greenhouse, for it is here that the seeds are sown in boxes in January. Early cauliflowers are raised in pots under glass also, while many of the particularly delicious vegetables like the New Zealand spinach, the sweet corn, and the aubergine have to be grown under glass first of all in pots if they are to be used early outside.

Those who want continuity of colour in the house will find the greenhouse a great boon. It enables chrysanthemums to be grown and flowered right up to Christmas, all sorts of bulbs may be forced and grown on for the New Year, while there are a host of flowering plants, as will be seen in Chapter XII, that can be grown to provide plenty of colour all the year round.

Foliage plants, including the ferns and the palms, are also useful for house and conservatory decoration, and these are grown in the greenhouse to perfection. Cacti and succulents are very fascinating and a nice airy greenhouse is just what they require.

Some will want to grow orchids, and if they follow the advice given in Chapter XVII they will get a good deal of pleasure from these interesting plants, while the man who wants a nice buttonhole every week in the year will learn to cultivate the carnation and the rose, details of which appear in Chapter XVI.

Years ago only the rich could afford greenhouses, but to-day they are no one's monopoly, and almost every garden has its own glasshouse, however small. One has only to look at any group of allotments in any country to see the number of small glasshouses that the allotment holders have put up during the last few years.

The greenhouse has become a necessity, and it is a good thing that this is so, for it does make all the difference, and is conducive to a happy and contented gardener.

It is difficult to describe gardening. It is certainly a craft.

To many it gives infinite pleasure. It is a method of getting out into the open air and doing the right kind of physical work. It enables one to get near to nature and realize the wonders of the works of God. It is undoubtedly the best hobby that men and women can take up.

We in this country need to learn to produce and also to appreciate beauty. The greenhouse can help us to do both.

It is an excellent aid to the production of good salad crops, which are so beneficial to human health, and it enables the gardener to produce lovely flowers which would not be possible in the normal way in the open. The English climate is wonderful. It is the best climate for apples, for instance, but naturally, it is not ideal for flowers collected in the tropics or from similar warmer climes.

When the beginner starts gardening he is usually quite satisfied to cultivate the land outside, but soon he feels the urge to have a frame in which he can raise plants early, and in which he can save the roots of certain plants during the winter. The frame soon leads to the greenhouse and once he has a greenhouse he realizes what wonderful pleasures gardening can give.

One small greenhouse often leads to another or a larger one, and so on, and we are perfectly sure that no garden is complete without its greenhouse structure, in which a man can work when conditions outside are not suitable and can ensure continuity of colour in the winter months.

Conditions in the greenhouse should be as near as possible to the conditions in which the plants normally grow outside. It is a great mistake to "coddle" plants. They should be given plenty of air. They should not be overwatered and the moisture content of the atmosphere should not be too high. Each plant wants slightly different conditions and so in a house devoted to more than one class of plant it is preferable to produce the average conditions under which all can live. There are houses within houses, so to speak, in which there are separate compartments which can be kept at different temperatures and different degrees of humidity, but these are rather expensive and are what the small grower may aspire to later on.

It is a delight to have a glasshouse because it is possible to force plants out of season. It is delightful to have strawberries early in the year, or to have French beans two months or so before they come outside. It is nice also to force rhubarb or sea kale underneath the benches without extra expense, or to grow a small bed of mushrooms.

The glasshouse, then, will not only be used to ensure continuity of colour or for the production of vegetables out of season. It will most assuredly be used for raising plants which will be ready to put out in the open when the weather is warm. It does not matter whether they are vegetables like carrots, celery or leeks, or whether they are flowers like asters, salvias, lobelias and the like.

However, all details are given in the chapters dealing with the various crops and the Author's object has been to show the possibilities of the glasshouse and to give brief details of great numbers of plants which it is possible to grow under glass.

CHAPTER II

CONSTRUCTION

May I have answers, please, to the following:—

1. Are there local building laws?
2. What types of greenhouses can I have?
3. Can I use concrete instead of wood?
4. Can you give me tips about painting?
5. What about putty?

GLASSHOUSE building is to-day a science and it is recommended that all who are considering building, should go to well-known firms who specialize in this type of work. A builder or an amateur cannot be expected to have the knowledge of those who have studied this special subject, and have over half a century's experience behind them. There are too many intricate points connected with the construction which only many years of practical experience can teach.

The first point to decide is whether a movable or permanent greenhouse is desired. In the case of the former, glasshouses erected in sections and secured by bolts can be purchased, the erection of which is a simple matter that can be dealt with by an amateur. In the case of the latter, a brick foundation is essential for satisfaction and permanency, and if a wall is built to where the glass starts, so much the better.

All such brick work must be on a scientific foundation. The thickness of the walls must be according to a long and high span, or else the weight of the construction will cause the walls to bulge, or the foundations to move if of insufficient dimensions. For the strength of the foundations there is the subsoil to consider, and many other considerations, which only the expert connected with the glasshouse firms can satisfactorily give.

Local Building Laws. A word would not be out of place here to remind the reader that these cannot be ignored.

A glasshouse is an exempted building in most districts, but

this does not preclude the purchaser from notifying the Local Authorities of the intention of its erection, and they have the power to disallow the erection of a wooden base house if adjacent to any dwelling house or neighbouring property.

A brick base house is usually allowed in any position subject to the brickwork being carried out in 9-inch work in suitable foundations, and the structure does not interfere with external ventilation of a living-room if placed against a dwelling house.

Here again a firm settles any legal point which may arise.

A tenant should make sure he has a written agreement with his landlord. In the case of a movable construction this is most important, as at the termination of the tenancy, the tenant may find he is no longer the owner of the greenhouse.

Types of Glasshouses. Before attempting to describe the construction of a glasshouse there are many points to take into consideration. For instance, in deciding upon a glasshouse, it is necessary first to consider the plan of the garden, the available space, walls, and especially the path of the sun, and also the nature of the crops to be raised.

It is because of these various factors that there are many types to consider, but those for general use can be reduced to three main classes.

- (1) The Span-Roof.
- (2) The Three-Quarter Span Roof.
- (3) The Lean-to Roof.

The decorative conservatories are altogether another problem.

(1) **The Span-Roof House** is the most popular and certainly the most useful.

It will readily be seen that this house is an equal span building with the ridge in the centre and each gutter or eaves line being the same height from the ground.

(2) **The Three-quarter Span House** is of unequal dimensions, the ridge being approximately two-thirds towards the back wall, which is usually about 25 per cent higher than the front eaves or gutter line.

(3) **The Lean-to House** has the ridge placed directly against

the back wall, the height of which should be equivalent to the continuation of the roof of the span or lean-to carried up until it reaches the point where the rafter would meet the wall, in other words the pitch of roof should be maintained at approximately 30° until the wall is reached. A roof slope less than this will cause water to work up through the laps in the glass sections, and condensation will also drop from the glass instead of running down it, and drop on to the plants below. (See page 27.)

In actual practice, a lean-to house is seldom the cheapest to build, and many existing walls are far more suitable for the building of a three-quarter-span glasshouse. For example, lean-to rafters must be increased in size or strengthened and even special bracing is required if the span is of considerable length.

The novice certainly needs the advice of the expert as to the advisability of constructing these three houses and also his advice, from an efficiency and economical point of view, as to which of them would be the more suitable.

The uses of these three types. Analysing the uses of the above types it can be done briefly as follows:—

(1) *The Span Type* is the most useful. It is designed to be placed in that part of the garden which receives the early, midday and late sun. Light being of vital importance, the span glasshouse obtains the full amount of light possible, and enables full benefit to be obtained both from the morning and afternoon sun. The equal distribution of such light is of great importance in the cultivation of plants under glass. In this type the plants are not likely to be drawn towards the lightest side of the house. Besides the best light, the span house also affords the maximum space.

It is quite independent of any other buildings or walls, and is used for general plant cultivation and occasionally the wider spans, say of 16 feet to 20 feet, are used as vineries or peach houses.

Economical and efficient heating, too, is a definite consideration, for all space is usable in this type of glasshouse, and there are no high empty spaces, walls, etc., to consume heat.

(2) *The Three-Quarter Span* is confined to a space in the

garden with its long roof facing south, and the back wall sheltering the house from the north winds.

It has the advantage of trapping more sun than the lean-to house.

This type is also suited for general plant work and can also be used for vines and peaches with advantage with say only 12 feet in width, as the long front roof is very suitably adapted for this purpose.

(3) *The Lean-to*. The usefulness of this house is not to be compared with the above two types because all plants are apt to be drawn towards the light.

It is most suitable for vines and peaches owing to its longish span of roof, but may also be used for general plant work if care is taken in situating the various plants their correct distance from the glass, building the inside stagings so that the back staging—that is, the one against the wall—is as near the glass as is consistent with the subjects to be grown.

CONCRETE IN GREENHOUSE CONSTRUCTION

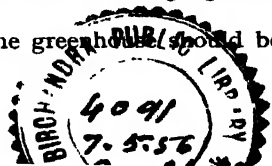
The handyman, who likes to do things himself, will find that concrete is the best material to use for the floors and walls of his greenhouse, while those with some knowledge of building or reinforced concrete work will be able to make reinforced concrete beams and sashes and thus construct the entire house of concrete. If this is possible, so much the better, as there will be no periodic painting to do. This is one of the main advantages of using concrete. It is permanent and does not require any upkeep.

Concrete Floors. For this type of greenhouse that is similar to the portable garage it is advisable to lay a concrete base which also serves as the floor.

By following a few simple rules anyone can lay a satisfactory concrete floor.

The floor should be at least 4 in. thick and the concrete should be composed of 1 part of Portland cement, $2\frac{1}{2}$ parts of clean sharp sand, and 4 parts of broken stone or shingle graded from 1 in. down to $\frac{3}{16}$ of an inch.

Laying the floor. The site of the greenhouse should be



marked out on the ground and this can be accomplished quite simply with the aid of wooden pegs and string. If the greenhouse has timber sides the top of the floor should be about 2 in. above the surrounding ground level.

The ground should be dug to the required depth and the sub-base properly rammed to form a firm and even bed for the concrete. If the ground is of a clayey nature then it is advisable to spread 2 or 3 in. of ashes or similar material on the ground before the concrete is placed.

When the site has been prepared the framework, which consists of four lengths of timber, say 4 in. \times 2 in., is laid on the sub-base and held in position by driving pegs into the ground around the outside of the frame that is formed.

If it is only intended to lay a concrete path or walk down the centre of the greenhouse, this can be laid after the house has been erected. The concrete should be divided into bays, the length of each not exceeding twice the width of the walk. Each bay should be divided from the next by inserting a thin length of timber or damp proof coursing.

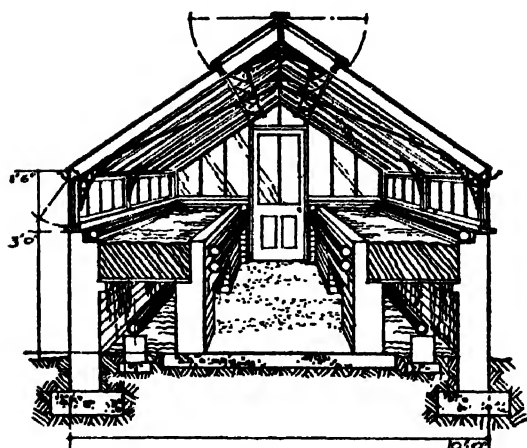
Mixing Concrete. In order to obtain the best results great care should be taken over the mixing of the concrete.

The materials should all be measured in a suitable receptacle such as a bucket. The two and a half buckets of sand are first measured and then mixed with one bucket of cement until there are no grey streaks to be seen.

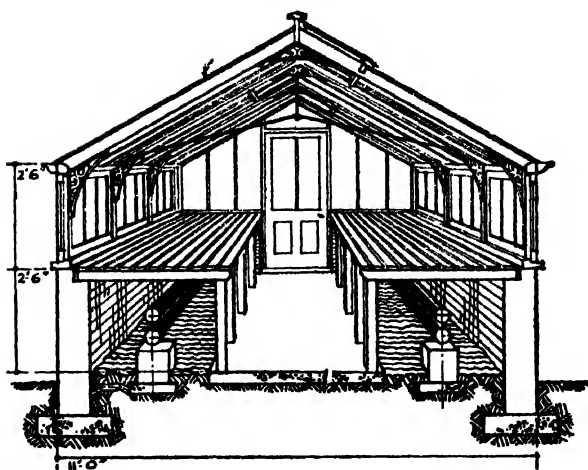
This mixture of cement and sand is then added to the measured quantity of broken stone or shingle, and the whole mass turned over three or four times. The water is then added, and the mixing continued. Do not use too much water as it will make the mixture too sloppy.

The frame is then filled with the mixed concrete, which should be well consolidated with a stout length of timber or a home-made rammer. The length of timber is drawn along the top of the frame to smooth the surface, which can also be gone over with a wooden float. The surface must on no account be overtrowelled as this brings the fine material to the top and tends to result in a dusty surface. It is advisable that a layer of waterproof paper be placed between the sub-

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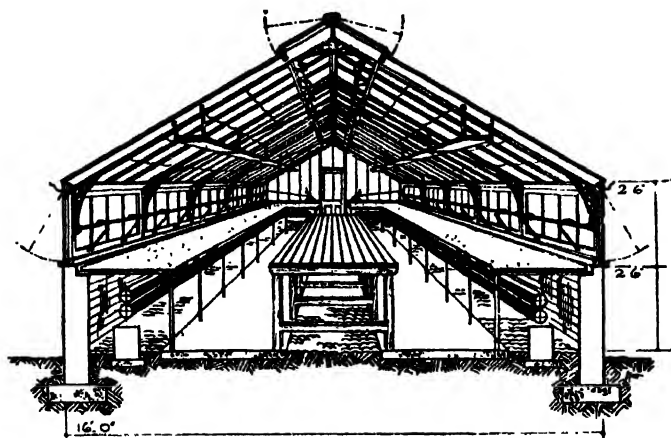


Cross-section of a Span Forcing House

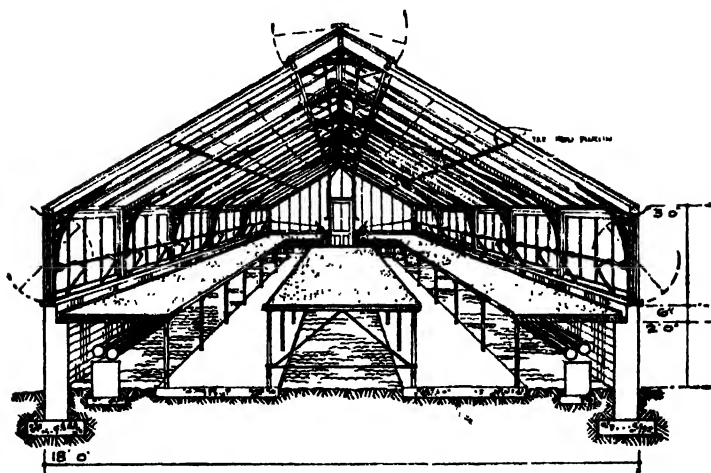


Cross-section of a Span General Utility Glasshouse

[Courtesy Duncan Tucker (Tottenham) Ltd.]



Cross-section of a Span Glasshouse with centre staging



Cross-section of a Span Glasshouse for Carnation growing

[Courtesy Duncan Tucker (Tottenham) Ltd.]

base and the concrete slab. This is to prevent the loss of moisture from the underside of the slab while the concrete is hardening.

If it is proposed to use timber for the walls or superstructure, holes should be formed in the concrete whilst it is still plastic in order that bolts for holding down the house may be grouted in at some later date. Some suppliers of portable greenhouses provide instructions and these should be closely followed.

Curing the concrete. There are still many people who believe that concrete hardens by drying out. Actually the reverse is true, as it is the presence of water which causes concrete to harden and therefore the floor should be covered with wet sacks or similar material to protect it from drying winds and the sun. The covering should be placed in position as soon as the concrete has hardened sufficiently so that the surface is not marred, and kept damp for at least seven days. Alternatively the floor may be covered with waterproof paper which will retain the moisture in the concrete.

Foundation for walls. It will generally be found economical to construct the walls of the greenhouse in concrete. These walls, as a rule, are only 3 or 4 ft. above the surface of the ground and may be constructed either of concrete blocks or of concrete laid in situ.

The walls should stand on a concrete foundation or footing which should be set below the frost line. A general rule for foundations is that the width should be twice the thickness of the wall. Thus the pressure due to the weight of the wall and any load the wall has to carry is distributed over a greater area, ensuring the stability of the structure.

The foundation should be about 9 in. thick and the concrete should consist of 1 part of cement, 3 parts sand, and 5 parts broken stone or shingle.

When the site of the walls has been marked out, a trench should be dug following the outline of the walls. It should be about 12 in. wide and from 15 to 18 in. deep. The concrete should be deposited in this to a depth of 9 in. and before it hardens the surface should be roughened to form a key between the base and the wall.

If the greenhouse is comparatively small then the foundations for the walls may be combined with the floor by increasing the thickness of the concrete at the outside edge of the slab.

Walls. To build the walls "in situ" it will be necessary to erect framework or shuttering, which is most easily made of timber. The important point is to ensure that the shuttering is sufficiently battened and strutted to prevent it from moving or bulging whilst the concrete is being placed.

Before placing the wall concrete, which should consist of 1 part of cement, $2\frac{1}{2}$ parts sand and 4 parts of broken stone or shingle, the surface of the footing should be well washed and wetted, in order to remove any dirt and wood shavings that may have fallen in between the shuttering.

The concrete should be placed in layers about 6 in. thick and each layer should be well tamped to effect consolidation.

The Glazed superstructure. If the framework for the glazed portion of the greenhouse is to be of wood, bolts to which a wood sill may be fastened should be cast in the top of the wall during concreting.

The all-concrete house has many advantages. The type manufactured by a specialist firm in this country is built on the curvilinear system, which allows the greatest influx of sun and light, as the glass sides may be carried down to ground level. This type of greenhouse has been in use in Holland for over forty years. It is easily erected on existing foundations and once built does not require any further attention in the way of repairs and painting.

Benching. The benching for the greenhouse may also be made of concrete and probably the simplest method is to build the piers in situ, and to precast the kerbs and slabs.

Foundations 6 in. deep and 3 in. larger all the way round than the size of the pier should be provided. The illustration on Page 23 shows the suggested dimensions for this portion of the work. The "slabs" may be cast in a flat frame $2\frac{1}{2}$ in. deep.

A concrete composed of 1 part of cement, $2\frac{1}{2}$ parts of sand and 4 parts of shingle graded from $\frac{3}{4}$ in. down to $\frac{1}{16}$ in. should be used. In order that the concrete may harden properly it

should be kept damp for at least ten days before the units are placed on the piers.

Considering the span house, this may be a purely portable type with a wood base usually 2 ft. 6 in. high with glass sides above, about the same height, making say 5 ft. in all to the gutter or eaves line.

The length and width are, of course, optional. It is, however, possible to have a standard wood base house 12 ft. \times 8 ft. \times 8 ft. to ridge, 5 ft. to eaves and this is a very serviceable size for the small garden.

This house is timber framed throughout and is glazed with 24 oz. glass bedded on bottom putty (no top putties being used).

The house shown on Page 22, is a brick base construction and is of heavier timbers in consequence, the same method of construction being employed.

Fig. 1 is the lean-to, which is usually only built where a high back wall exists.

Fig. 2, page 27, shows the three-quarter span type house described under that heading and its construction is readily seen.

The same remarks apply to this house as the three-quarter span, except that the rafters have to be either of heavier construction or trussed by means of metal rods, or again may be supported by purlins and posts at intervals.

It is possible to have an ingenious type of metal house where there are eight separate compartments, each individually heated, ventilated and staged, and the whole being portable and adjustable to several different heights.

This house is designed in multiple lengths of 5 ft. and a total width of 10 ft. 6 in.

There is a corridor down the centre and dividing doors at each 5 ft. length.

Practically all the various species of plants can thus be grown under one roof successfully owing to the individual control of each section.

Again if the stages are removed a bed can be made up and lettuces or root crops forced.

Seakale or rhubarb can also be grown if the metal stage is

LEAN TO GREENHOUSE

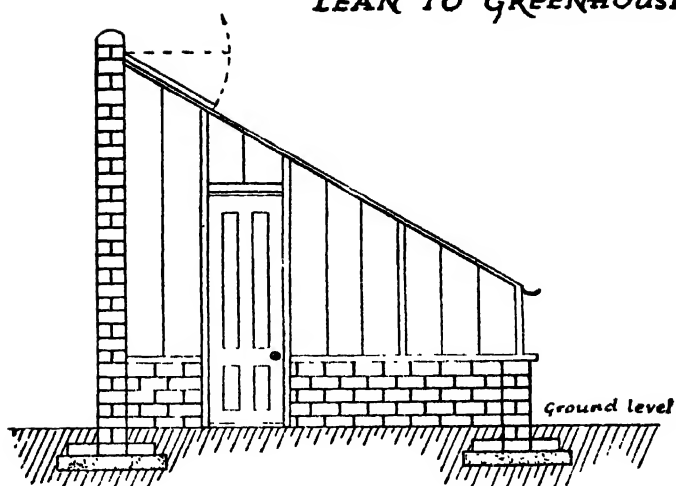


Fig. 1

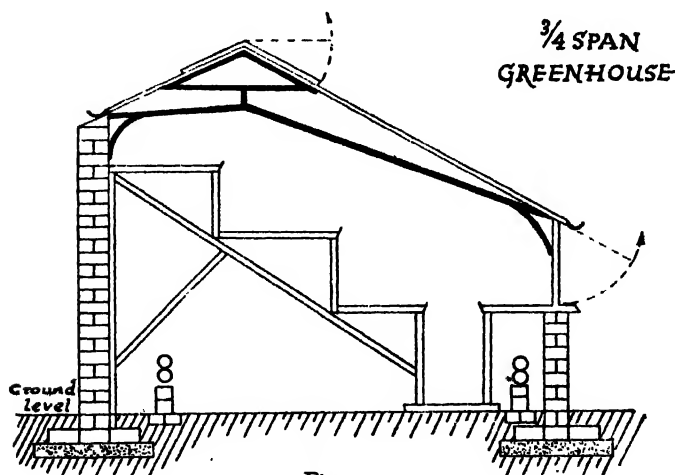


Fig. 2

left in position, and sacking be hung down in the front like a curtain thus forming a dark and warm bed for the purpose.

PAINT—PAINTING

1. **Priming.** All ordinary timber should receive at least three coats of paint. A glasshouse has exceptional circumstances and strains to meet, not only from weather conditions outside, but from the excessive conditions of a damp warm atmosphere inside.

It cannot be too strongly emphasized that the life of the wood-work and the paintwork depends on the first priming. The very best type of priming is essential, which is red and white lead. The best paint applied over a poor primer always gives unsatisfactory results. The priming provides that necessary adhesion between the wood and the succeeding coats.

Priming ought to be done before erection and also the first coat of paint given—in fact one cannot stress this point too much, as these two coats will protect the surfaces which will not see paint or any preservative again. It is at the joints that trouble generally commences, and special attention should be paid to all corners and places where moisture is likely to gather.

2. **The Paint.** It is never worth while to use a cheap paint. It does not stay on, it does not preserve the wood, and also, knowing the cost of labour is far in excess of the cost of the actual paint, cheap paint turns out to be the most expensive, and has detrimental effect on the life of the wood.

The genuine white lead paint is considered the best for the wood work. Unfortunately paints have a short life in the proximity of the sea coast, and the finishing coat should be "round" and oily.

3. **Final Coat.** After the glass, which should be a good English horticultural kind, is bedded, a good coat of paint should cover the whole completed structure.

The external paint should cover the glass by a quarter of an inch, but should not spread further on the glass than the width of the sash bar, otherwise the maximum amount of light will not be obtained.

The putties should be the best linseed oil putty and nowadays front putties are seldom employed.

Preservation of the structure and repainting. If the woodwork is desired to last and to be well preserved, there is only one solution—regular painting.

The utmost importance should be given to the outside to prevent the wet getting in.

The putties should be kept in perfect order.

The old paint which may have chalked or scaled must be thoroughly rubbed and washed off and a perfectly clear surface is needed before repainting.

The importance of the above, and only painting when the wood is dry, cannot be over-estimated. If there is any moisture in the wood, blistering and other unsatisfactory results may follow.

It is difficult to say how often a glasshouse should be repainted. Under ordinary climatic conditions genuine white lead will stand well between two to three years. Near the coast (salt sea air) and in the proximity of factories where there are many impurities in the air, it has a much shorter life, and two years is the most that can be expected of it.

If the work is given out, the painters themselves should always be well watched that they do carry out the above points, that they work the paint well into the wood, and that they are not allowed access to the oil or turpentine. Too thin or too thick a mixture produces unsatisfactory results.

For inside work, except in the case of cucumber and propagation houses which are generally painted every three years, it is difficult to say how often the houses should be painted. It depends on the condition of the old paint.

If houses are well painted the light reflection is increased to the maximum, as well as having the satisfaction of knowing that the woodwork is well protected.

If the work is given out, employ a firm of repute who pay standard wages, and employ only tradesmen who can be relied upon to do a first-class job. There are some cheap-jack firms in this trade as in others—one only gets what one pays for and a cheap article or job is very often dearer in the long run.

CHAPTER III

HEATING

I want to know about

1. Oil heating.
2. Heating by gas.
3. The use of coke.
4. The use of electricity.

THE utility and success of a glasshouse, however well it may be constructed, depends on an efficient and dependable heating installation.

It is impossible to lay down any hard and fast laws on the subject of the size of the apparatus needed. The advice of an expert should be sought before embarking on any outlay as regards this matter.

There are four methods which are commonly used.

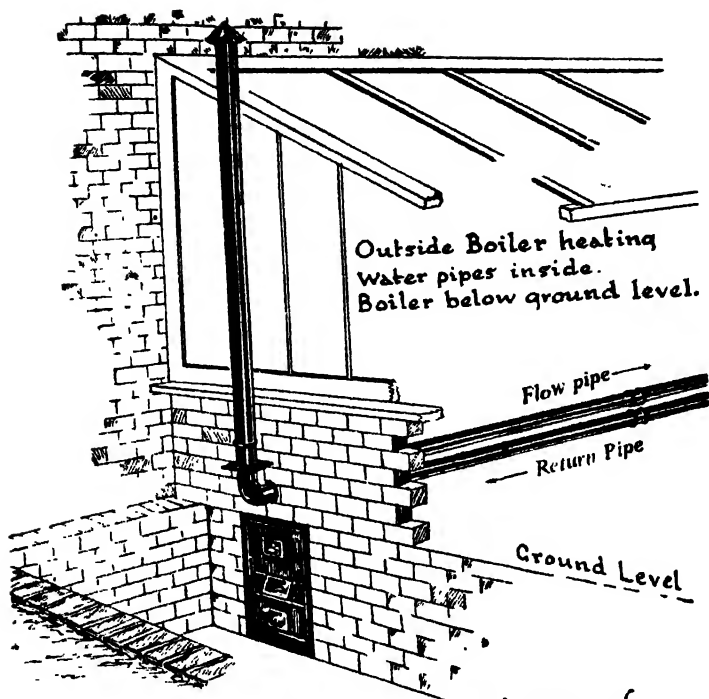
1. **By oil.** A small greenhouse may be heated by a portable oil apparatus. This will exclude frosts, but a forcing temperature cannot be maintained.

Lamps or stoves with open tops for escape of heat cannot be recommended. The heat is drawn straight up, fumes from inferior oil can be harmful to the plants, and such heat is apt to produce too dry an atmosphere for many greenhouse plants.

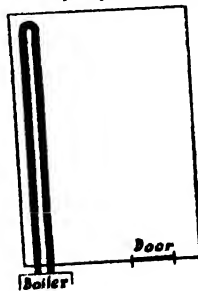
There are firms which have economical and efficient heaters, giving variation of heat according to the weather, and they will burn for three or four days without attention.

2. **By gas.** A serviceable type of small apparatus is the method of water pipes heated by gas, but so constructed that no fumes can reach the interior of the house.

A typical gas hot water boiler is known as the "Bourne." It is constructed for inserting in the end of the house, the lighting door and flue tee being outside. The gas consumption is economical. By means of the gas regulator provided the



Diagrams shewing 2 different ways of fitting the hot water pipes in the greenhouse



gas consumption can be set to suit the piping that has to be heated. Heat can be controlled by regulating the gas tap, also by the use of an automatic temperature regulator. All is automatically controlled and there is no waste.

It is easily fixed, no attention is needed beyond occasional addition of water and the flueways are accessible for cleaning.

No outside construction is needed, thereby saving cost and space.

There is a definite advantage having a gas or oil heater, in that, to a great extent they look after themselves, whereas coke and coal apparatus need frequent attention.

3. **By coke or coal.** The method of heating generally adopted makes use of a system of hot water pipes heated by a coke boiler installed in the wall or apart from the glasshouse.

There are many modern boilers on the market which are simple, efficient and thoroughly reliable.

An example of a wall "radiator" is seen on page 31.

The well-known Horse Shoe Boiler is a typical type and is designed to fit in the base of the glasshouse. If required a simple automatic draught control can be provided at a small extra cost, and the ample fuel space ensures heat for long periods without attention.

The complete equipment includes boiler, expansion tank, flue pipe and hot water pipes, etc., and the installation is a very simple matter.

Where the boiler is installed separately, the Tubular Boiler maintains its popularity amongst growers.

For shallow stokeholds, the Bisson Tubular is recommended, also the Rochford, Robin Hood and a host of others.

The whole range has been recently re-designed to give increased efficiency and strength.

An experienced technical staff in most firms is at the service of clients to advise on all heating problems.

4. **Electrical heating.** The Electrical Tubular system thermostatically controlled is gaining rapidly in favour owing to its simplicity of control and lack of attention required.

Much criticism has been levelled at this form of heating

owing to the alleged drying of the atmosphere to a greater extent than with the hot water pipe method. This bogey has definitely been laid in practice and the most highly satisfactory results have been obtainable by this electrical form of heating.

The running cost is greater unless the unit is at $\frac{1}{2}$ d. or less, but in many cases, especially in the case of the "private" owner, the extra cost of running is outweighed by the labour saved. A thermostat inserted into the electrical circuit is used to maintain the glasshouse at any pre-determined temperature by cutting off, and switching on, the current when required. This is of great value, being self-operating, as there is no waste in consumption and also the owner is safeguarded against sudden drops in temperature, as well as too great a forcing heat, at any time.

The layout of piping. It is impossible to give reliable advice on the size of piping required for a given temperature.

The advice of the expert must again be resorted to.

The outline plans for the flow and return hot-water pipes are seen in the illustrations showing alternative methods. (See page 31.)

The position of pipes should receive careful consideration, making sure that the flow pipes always rise gently from the boiler. The return pipes should have a corresponding fall back to the boiler.

CHAPTER IV

EQUIPMENT OF THE GREENHOUSE

If I am to equip my greenhouse tell me about

1. The water tank.
2. The propagating frame.
3. Thermometers and charts.
4. Watering cans.
5. Syringes and sieves.

DIRECTLY the greenhouse has been built it has to be equipped. Much of the equipment should be incorporated in the building, and the quotation given for the house may include the staging, a sunk water tank, and even a thermometer.

The staging. The side staging should be from 3 ft. to 4 ft. in height, while the central staging may either be of the same height or may be tiered as in the drawing on page 23.

It is convenient, for cleaning purposes, if the surface of the staging is removable. Permanent slatted wood is sometimes used, but it is not ideal, because it gives too great a circulation of air, and plants are apt to dry out in hot weather in consequence.

Slates are therefore sometimes used, and on these, shingle, gravel or ash is laid to a depth of 2 in., and this helps to hold the moisture.

Corrugated iron cut to size can be used instead of slates, but this has to be renewed every four or five years because it rusts away. The initial cost of the slates is about four times that of the corrugated iron.

Material on the staging. Shingle is very good indeed, for not only does it last for ever, but it can be washed every year when the house is cleaned down. Gravel is quite good, but because of the clay particles it may contain, is not as useful as shingle. Ash has to be changed every year, and if it is going

sizes will help to firm the compost around the outside of the ball when potting. See drawings of these on page 38. Flat boards with small handles can also be made to fit the various sized boxes, pans and pots, and these are used for obtaining a smooth surface before seed sowing—and for firming.

Bamboos and supports. All the supports used in a greenhouse should be as inconspicuous as possible. They should be strong enough to do their work, and yet be slender. Bamboo canes can be bought stained green, and so can specially shaped sticks made for the purpose.

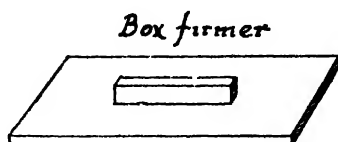
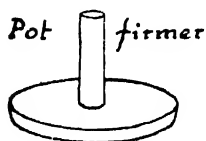
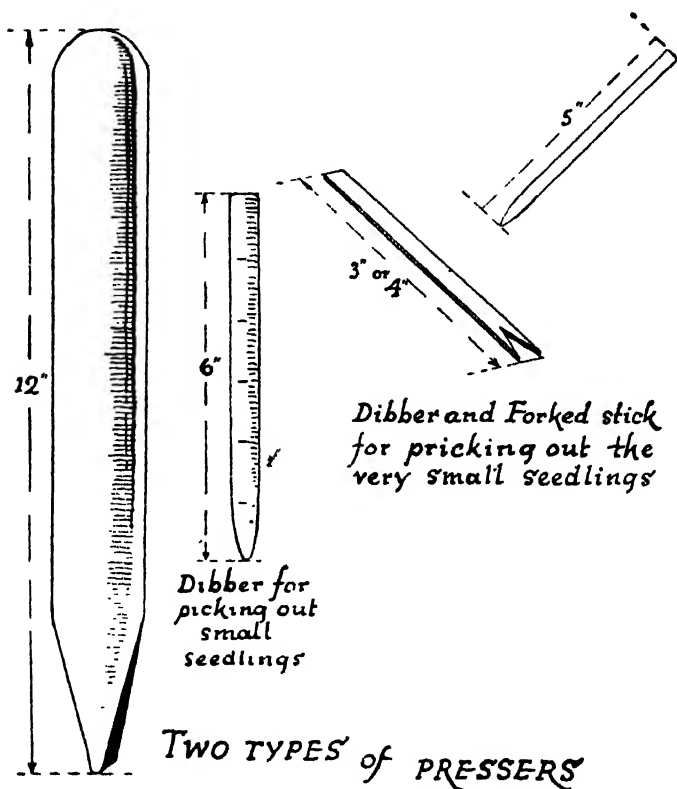
Wire frames. Special wire frames may be purchased for the trailing and climbing plants, galvanized rings affixed to galvanized rods may be used for begonias, carnations and the like.

Thermometers and charts. The thermometer is a most important piece of equipment. It is as well to have a guaranteed tested one, for many of the cheaper kinds on the market are not reliable. If two or three thermometers may be "borrowed" from the ironmonger and be hung in the greenhouse together the results are often very entertaining!

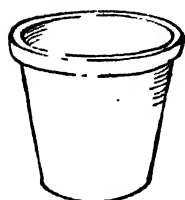
The man who is really interested in the history of his plants is advised to keep a temperature chart. This can easily be made from any ordinary graph paper, and the actual temperature at say nine o'clock every morning can be plotted on the chart and a graph thus made. It is amazing the difference the careful plotting of a graph can make to the cultivator. He soon knows whether the heating apparatus is doing its job or not, and whether the fuel is being wasted.

The watering can. Without a doubt the Haw's patent type of can is the best for the greenhouse. It has a long spout, and the can may be gripped by the handle or by the crossbar that goes from the opening to the spout. It is, in fact, a perfectly balanced can. It is very easy to dip into the tank, it fills quickly, and the length of spout allows the plants at the back of the staging to be watered easily. The pressure also from the weight of water in the can forces the water out through the finest rose, with perfect evenness.

"GADGETS" for use in the Greenhouse



FLOWER POTS showing sizes and numbers used in the trade .



11 1/2"
N°12



9"
N°16



8"
N°24



6 1/2"
N°32



5"
N°48



4 1/2"
N°54



3"
N°60



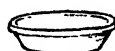
2 1/2"
Small
N°60



'Thumb'
N°60

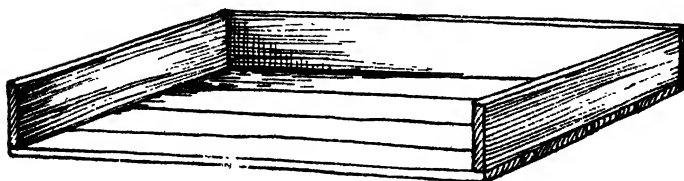


'Thimbles'
N°60



Seed Pan

A PORTABLE POTTING BENCH 4' x 2'



There are various sizes of these cans, for a large house a 3-gallon can is ideal, and for the moderate sized house the 2-gallon can. For plants on the shelves a Haw's containing 1-gallon is quite sufficient.

A good can is always a good investment. It will outlast the cheaper kind, and because it is properly made is quicker and easier to handle.

The syringe. Here again it is well worth while investing in a good brass syringe that will last. Syringes are very easily dented, and once they are, the plunger will not move up and down. A syringe made of thin metal will constantly be out of use for this reason.

Some syringes have a particular flange or cup-shaped formation attached to them in order to catch the drips.

For the bigger house two syringes should always be available, the larger one for applying moisture with a good deal of force, *i.e.*, when damping down or washing foliage, and the smaller one for spraying insecticide or fungicide and for watering baby seedlings. ✓

✓ **The potting tray.** Those who have a number of greenhouses build a special potting shed in which the mixing of the composts and the actual potting operations are done. With one greenhouse it is advisable to have a portable potting bench that may be erected on folding legs whenever potting has to be done. This makes it unnecessary to take the young plants out of the house, and so safeguards against their getting chilled.

A convenient potting tray is 3 ft. wide, 3 ft. long and has back and sides 1 ft. high. A smaller sized tray may be made to suit the requirements of the house. (See illustration, p. 39).

Tapper. It is quite easy to make a small tapper, which can be fixed at the end of a short or long bamboo as desired. The head of the tapper is normally 1 in. or $1\frac{1}{2}$ in. in diameter, and $1\frac{1}{2}$ in. long.

CHAPTER V

MANAGING THE GREENHOUSE

I must have help on

1. Temperatures in the house.
2. Shading outside.
3. Water and watering.
4. Cleanliness and cleaning.
5. Vents and ventilation.

THOSE who are responsible for greenhouse management should always remember that plants should be grown in as natural a way as possible. They should be given atmospheric conditions similar to those which they would experience in their natural habitat. It is a great mistake to coddle, to refuse sufficient air, to over-water or to crowd.

Ventilation. The ventilators not only help in the regulation of heat but enable fresh air to be supplied. As a general rule it is better to over-ventilate than to under-ventilate. The general theory of air movement, of course, is that the hot air will rise and flow out of the top ventilators, and the cold air will enter to take its place through the side or end ventilators. With a glasshouse this scheme cannot always be relied on, for the inside movement of air is to some extent controlled also by wind movement outside, the position of the sun and so on.

Most houses have top ventilators, in some cases intermittent and in others running the whole length of the house. In addition, there are a certain number of side ventilators and occasionally what are known as bottom ventilators. These are generally of the box type, and are fixed below the staging. They are not found in modern houses because they dry the air around the plants. Gardeners of long ago found them useful in the winter for admitting a little air during the winter when the weather was very frosty.

As a rule the ventilators are opened up early in the morning and are closed down or partially closed down in the afternoon or early evening so as to help trap the sun heat and so save fuel. Naturally the times of opening and closing differ tremendously in summer and winter. It may be necessary to ventilate all night in summer or at any rate not to close the ventilators down until about nine o'clock.

When ventilating, always open the top ventilators first, and when they have been letting out the hot air for some time then give some side ventilation.

It is necessary to avoid draughts at all costs, and for this reason ventilators should never be opened on the windward side, even if the wind is only a light breeze. Always open side ventilators and top ventilators to leeward.

Ventilation should be given on a rise in temperature ; that is why the house is opened up in the morning as the sun begins to rise. There is never any need to get panicky about high temperatures if the high temperatures are produced by the sun heat only. There is no harm in the temperature rising 15 degrees if this is due to the sun. A rise of 8 degrees though, due to pipe heat, might be very harmful to the plants. More air is let in to keep the temperature level ; the gardener does not primarily give air for the purpose of lowering the temperature.

To explain it another way, it is necessary to put on air (as it is called) in anticipation of the temperature rising, and not when it actually has risen. In this way the temperature is kept level. A bad gardener gives air when he has too much fire heat. This is not the right way of keeping the temperature down. The obvious way is to damp down the fire, turn down the gas, reduce the electrical heat, or to regulate whatever method is employed for warming the greenhouse.

Though it may be possible to open the ventilators suddenly, it is *never* advisable to close them down in one movement. The ventilation should be reduced gradually. A little less ventilation as the sun starts to go down, yet a little less, and finally the closing.

The amount of heat used and the time and amount of ventilation given depend very much on the weather conditions.

During a damp dull period the air in a glasshouse will tend to be sluggish. It is then that greater heat can be used in order to cause the air to circulate and help provide a buoyant atmosphere. This increase in heat should only be done for short periods in the winter, or otherwise weedy growth may result. Naturally, on dull days it is possible to open the ventilators when the house is at a lower temperature than when there are sunny warm periods for the sun heat does not "injure" plants like pipe heat.

Temperature. It is difficult to be dictatorial about temperatures for these differ, naturally, from plant to plant. Those who intend to have a cool greenhouse will find it sufficient to have a temperature of round about 50 deg. F. during the daytime, and round about 40 deg. F. at night time. This during the winter. In the spring, *i.e.*, during April and May the heat may be allowed to be somewhat higher in each case than these figures, say 5 deg. mentioned above to 8 deg., and in the summer very little artificial heat should be required. It is as well just to keep the pipes warm so as to ensure the circulation of air.

The tendency is to cut off artificial heat altogether—and although this can be done—the air in the glasshouse will become stagnant, and mildews and other fungi thrive in consequence.

Those who go in for plants that like a warmer atmosphere should aim at a temperature of 45 deg. F. at night and 55 deg. F. in the day during the autumn and winter, and say 55 deg. F. at night time and 65 deg. F. in the daytime in the spring and summer.

The man with one small greenhouse who wishes to grow a variety of plants will naturally have to try and strike the happy medium. Fortunately, it is extraordinary the way that plants will get accustomed to, and grow quite well in, temperatures at which they are supposed not to thrive. As a general rule it is better to err on the lower side where heat is concerned, though every precaution should be taken to keep out frost during the winter.

Shading. Another method of keeping down the temperature is to use some form of shading. Plants that are growing

WATER POT PLANTS DURING PERIOD OF VIGOROUS GROWTH



*Insufficient
water*

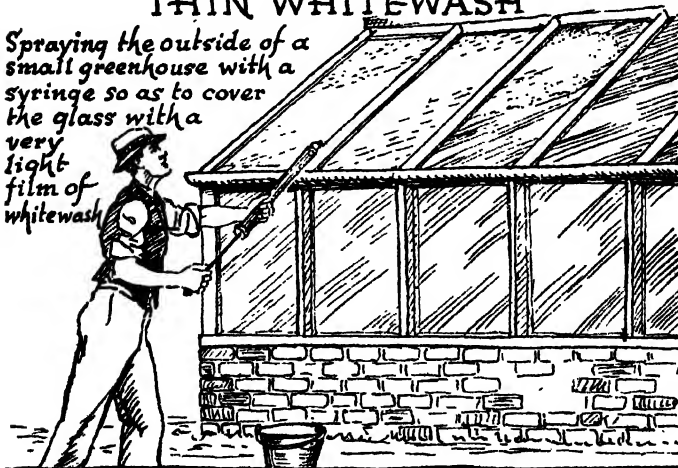
*Note level
to which water
has gone!*



*Enough
water*

SHADING THE GREENHOUSE WITH THIN WHITEWASH

*Spraying the outside of a
small greenhouse with a
syringe so as to cover
the glass with a
very
light
film of
whitewash*



in full sun are apt to dry out very quickly and shading or partial shading naturally prevents this. Plants need damping down or syringing when growing under glass and they may be scorched as a result if the house is not shaded. This, of course, also reduces the temperature.

Many plants, like ferns and the primulas, do best in shade and if they do not have it they wilt.

There is no need to shade unless the sun is strong. Shading which is done during a dull summer or when the sun is quite mild can be harmful for the leaves of the plants will be unable to manufacture elaborated sap, with the result that the growth will be both leggy and weakly.

Shading can be done in various ways. Some like to use flour and water, and this has the advantage of being able to be put on thinly. It is not, however, good either for the putty or for the paintwork and so its use cannot be advised.

A solution of hydrated lime in water is very common and can be sprayed or put on with the lime wash brush. There is a tendency to put it on too thickly, and care should be taken to prevent this.

Many horticultural sundriesmen sell a special wash for the purpose commonly known as Summer Cloud. This is easy to apply, lasts well and gives just the right shade desired. Unfortunately it is somewhat expensive.

The ideal is to use blinds, made either of slatted wood or green proofed tiffany. These can be raised or lowered as desired and can be used one side of the house or the other as necessary. They not only give protection against sun heat during the summer, but they can act, if you particularly wish it, as an extra guard against frost during a cold winter's night. Tiffany blinds naturally are better taken down during the winter and stored to prevent them from rotting, but the slatted wooden blinds can remain on their rollers at the head of the glasshouse all the year round.

Watering. One of the most difficult things to teach students at a horticultural college is correct watering. The true plant lover gets to know by experience whether it is right to water or whether moisture should be withheld. It is possible

to tell almost by looking at a plant and by knowing it, too, of course, whether it ought to be watered.

There are, however, some general principles to be followed and these will be dealt with.

First of all the natural habitat of the plant must be known. Does it normally grow in the desert or on boggy land? Is it found in nature on the tops of mountains or in the valleys? Does it grow best on a northern or southern slope if left to nature?

Naturally, the conditions in the glasshouse cannot be exactly the same, but plants from desert regions will require little water, and this should perhaps be given in the spring when the moisture will be stored in the leaves as in the case of Euphorbias which come from Madagascar. Where plants come from districts where the rains are seasonal and where there are periods of long drought, the plants in the greenhouse should have a similar dry resting period. The greenhouse owner gives this opportunity by placing the plants under the staging and leaving them there until their period of growth and watering comes round again. This is the way to treat Thunias from India, and Gloxinias which came to us from Brazil. Plants should not be dried out suddenly, nor should they be watered again just as suddenly. Both the drying off process and the bringing into growth process should be done gradually.

Where little is known about the plant's history much can be learnt from the looks of the plant. If it has a woody stem with tiny leaves like the heaths, little water may be necessary, but the plant should never be allowed to dry out; if the leaves are thick and leathery then it is a type of succulent and in all probability comes from droughty conditions so that watering need not be so frequent.

The plants that have large and broad leaves and are quick growing will require watering almost every day, but the plants with more leathery leaves that grow slowly will appreciate being syringed over and will not require so much moisture at the roots.

There are other factors that affect watering. When a plant is growing and is manufacturing plant food it needs plenty of

water, for this helps in conveying the elaborated plant food from the leaves to other parts of the plant. When, on the other hand the plants start to flower they are using up the manufactured food and so need less water. As a matter of fact plants that are given heavy waterings when in flower usually cease flowering promptly as may be proved by treating annuals in this manner.

In the winter plants are never as active as during the spring and summer, and so, even if they are not resting, the amount of water supplied may be reduced. Again, during bright sunny periods more water is required than during dull weather. The greater the ventilation the more quickly will plants dry out, and this is one of the reasons why in sunny weather shading should be given in addition to ventilation.

Old plants, like geraniums, that have been cut back will need far less water because the leaf surface has been reduced and yet the root system remains the same. Plants that are really healthy need more moisture at their roots than those that are sickly. Where plants are pot bound more water has to be applied than where there is plenty of soil in which the root system can grow.

The amount of water given also depends on the soil. A good peaty compost requires less watering than one that is rich in sand (this is one of the reasons that the use of horticultural peat is recommended in Ch. VI). A peaty compost should never be allowed to dry out though, and if it does the pot should be well soaked in a tub and not watered in the ordinary way.

A plant that is potted firmly always requires less water than a similar plant potted loosely.

Flagging may be caused both by under-watering or by over-watering. As a rule when too little water is given the plants stop growing and start to harden while the lower leaves will fall off. If too much water is given the compost becomes airless, the leaves go yellow and the plant looks sick and eventually dies.

The water given should always be at the same temperature as the house and soft water is better than hard water. It is advisable to use a rose on a watering can, especially with newly

potted plants. A good general rule is never to direct water over the crown of the plant in the case of those that tend to rot at the crown, *e.g.*, primulas. In this case watering should not be done with the rose, and the gardener's finger can direct the water flow if placed over the end of the spout.

It is a mistake to give little sprinklings of water continually. Watering should always be done thoroughly when it is done, and if possible just before the plant requires it. It is quite a good idea to tap the pot with a little wooden hammer or with the knuckles and by the sound which is heard a good gardener can tell whether water is necessary or not.

A clear hollow ringing tone means the plant needs watering. A rather dull low muffled tone means that the soil is sufficiently moist.

In summer, it is better to water in the evening so as to give the plants a chance of using the moisture during the cool period. This doesn't mean that it isn't possible to water plants in sunlight. In the winter it is best to water about ten o'clock in the morning as from this time onwards the temperature should begin to rise. As a result the surplus water will drain away before nightfall.

Pans and shallow boxes of seedlings are best watered by standing them in a shallow container filled with water at the right temperature. Overhead watering tends to encourage damping off. To avoid continual watering some gardeners plunge such pans and boxes into peat moss or fibre.

Damping down. Damping down or syringing should be used as an adjunct to watering and is most important in the warmer greenhouses where moist conditions are necessary. It prevents plants from transpiring too much, helps to keep the atmosphere moist and does much to control red spider and thrips, particularly the former.

The actual damping is done to the paths, staging, pipes and walls. It can be done with a coarse syringe or through the spout of a watering can.

Fine syringing is done to provide a kind of natural dew or rain. It helps to prevent flagging, and to keep the leaves fresh and clean. It is always best to syringe the underside of

leaves first and then to give them a light sprinkling over. One syringing a day is usually sufficient during the winter, and four syringings may be necessary in a warm summer. A plant in flower, a hairy-leaved plant, or an inactive plant should never be syringed.

Cleanliness. It seems hardly necessary to emphasize the necessity for cleanliness. If it is advisable in the garden it is all the more important under glass.

Dead leaves and flowers should always be picked off and burnt, the pots should be weeded regularly, and moss and algæ should never be allowed to accumulate on the top of pots, as this prevents air from getting at the roots. The sides of pots should also be kept clean, particularly in the case of epiphytal orchids. Evergreen plants should have their leaves syringed, and if necessary sponged, to prevent dust collecting on them. All walls should be whitewashed at least once a year, and where there are inside tanks these should be cleaned out regularly, the insides being scrubbed well, and painted with a thin Portland Cement wash, or if this is not readily available, with whitewash, as this will assist in reducing corrosion.

The outside of the glass should be cleaned at least once a year, and those who live in sooty towns will be advised to wash the outside three or four times a year. Where the panes have got engrimed Premax acid should be used, and be washed off immediately. This will clean up the dirtiest glass.

The inside of the house should be washed once a year with carbolic soft soap to which six fluid ozs. of formaldehyde have been added to two gallons of water. It is easiest to wash during the summer as many of the plants can then be put outside.

Paint the outside of the house with genuine white lead paint at least every three years. The inside of the house should also be similarly painted every three years. This is the minimum life which would be expected from genuine white lead paint, and it may be found that the paint is in good condition for an appreciably longer period, in which case the maintenance period could be lengthened. It is important that the paint should be applied when the surface is free from moisture and for this reason outside painting during unfavourable weather

conditions, such as when it is raining, foggy or in the early morning after a frost, should be avoided.

For the painting of houses with high temperature and humidity conditions, some authorities prefer the use of white lead-zinc oxide mixtures, where the zinc oxide does not exceed 25 per cent of the total pigment. Special greenhouse paints of this type are available ready mixed from leading white lead paint manufacturers.

Some people like to paint the pipes and generally use for the purpose a good vegetable black mixed with boiled linseed oil and turpentine, and a little paste driers. The reason for using this paint material is to obtain a black surface which is the most effective for the radiation of heat. However, if it is borne in mind that the heating pipes in a glasshouse work to a greater extent by heat convection which is not affected by the colour of the surface, rather than by heat radiation and also that there is only a small percentage difference in the radiation value for different surfaces, it will be appreciated that this special treatment is not nearly so important as it might at first be considered.

It might be considered better to paint the pipes with white lead in with the rest of the work, and get the maximum of reflected light possible, as well as good protection against corrosion of the pipes.

Where shingle is used on the staging this should be removed once a year, be washed in suitable sieves and replaced.

It is not possible to be too careful about cleanliness in a glasshouse, for it is so easy to harbour pests and diseases in all sorts of cracks and crannies.

The buds chosen should be firm, and be from the current year's growth. They should be removed with the sharp blade of a knife so as not to make a deep incision. The bud may then be inserted the right way up in the T-shaped cut whose bark has been slightly raised for the purpose. The bud should be bound with bass from the bottom upwards, the actual "nose" of the bud being allowed to peep out. The binding should be loosened in three weeks. If the leaf stalk drops off naturally, the bud has "taken," but if it withers it has not.

In March the stock should be cut down to within 3 in. or 4 in. above the bud, and as the bud grows it should be tied in loosely to this "snag." The following June the stock may be cut back still further to a point just above the bud.

Grafting. Grafting may be done both under glass and outside. Under glass it is usually carried out in February or March, or even in July, August and September. Outside grafting time is usually April and May.

In all cases the stock and scion must be in the same condition. It is usual to remove the scions (pieces of one-year-old-wood) in the winter and to heel them in sand outside.

Whip and tongue grafting* is carried out when the stock and scion are of the same size ; saddle grafting when the stock is somewhat larger than the scion, while root grafting is done under glass when the plant is dormant, in a similar manner to whip and tongue grafting. In this case the graft is covered with soil and placed in a propagating case with a certain amount of bottom heat.

* Details and drawings appear in the companion volume *The A.B.C. of Fruit Growing*.

CHAPTER VIII

VEGETABLES UNDER GLASS

Interesting facts we learn here are

1. That the air must be kept buoyant.
2. That the pots should be stood in the soil, with the plants inside.
3. That male flowers are not required with cucumbers.
4. That lettuces shouldn't be allowed to flag.
5. That French beans do not want water till they have germinated.
6. That cress should be cleared in 14 days

A GLASSHOUSE can be used for growing large numbers of vegetables. There seems no reason to suppose that all vegetables could not be grown under glass if necessity arose. As a general rule, however, in this country the glasshouse is only used for those vegetables that do not grow as profitably or succulently out of doors, or for the growing of vegetables so as to get them out of season.

This chapter will therefore deal briefly with such crops but mentions also various vegetables which are raised in the greenhouse ready for planting out later on.

TOMATOES

General. It is said that the tomato was first mentioned in literature in 1554. It certainly appeared in a book called *The History of Plants* published in 1557 where it was called *Le Pomme D'Or*. It was not popular as a vegetable until about 1882 when it was sold in the London Markets. Now tomato growing is an industry of great magnitude.

Heavy crops of tomatoes have been produced from plants growing in only 6 inches of soil, but normally they prefer a good depth of earth, adequate drainage and plenty of head room. Tomato growing as such usually covers a full season,

the seedlings appear and then remove the glass, leaving the paper on for another day or two. During the whole of this period the temperature of the house should not go below 60 deg. F. Keep the atmosphere of the house moist and buoyant, so damp down the pathways and the soil beneath the staging and so on every day. The only exceptions are during a very cold dull period when the seedlings should be kept on the dry side.

Potting up. When the first two real leaves have developed the plants may be potted up into 3-in. pots, using the No. 2 John Innes compost (see page 52). Crocks are usually not placed in the bottom of the pot but instead a small quantity of coarser bits of compost are put into position first and the rest of the specially mixed soil is put on the top. Care must be taken not to pinch the stems of the plants with the fingers. They should always be held by the leaves. A seedling can be held with one hand and the pot filled with soil with the other. Once the plant is upright both hands can be used for firming the soil in the pot and thus all avoidance of injury to seedlings is ensured. Do not pot tightly as during watering the soil is bound to become tighter. Always leave about $\frac{1}{4}$ in. of space at the top of the plant for watering. See that the plant is in the centre of the pot with the seed leaves resting on the soil. Be sure the surface of the soil is level and that no finger or thumb marks can be seen.

After potting. Stand the potted seedlings on the staging. Water well through the fine rose of a can and keep the temperature of the house at 65 deg. F. at night-time with a slight rise by day, so as to help the plants to get over their disturbance. More damping down of the pathways and pipes will be necessary. Directly the plants become established reduce the temperature to 60 deg. F. and on all favourable days give some ventilation, even if only for an hour or so in the middle of the day. Water as little as possible though, it is better to keep the plants on the dry side. Aim at a stocky sturdy plant with a good root system. Watch out for what are called rogues. These are deformed dwarf plants very often with fern-like leaves or the spaces between the leaves being

reduced so that the plants give the appearance of a rosette. These "Jacks" or "Christmas trees," as they are sometimes called, must be discarded promptly.

Planting. When the plants are 5 or 6 in. high, and have a really good root system, they may either be potted up into large pots or boxes or they may be planted out in the border.

Planting out in the border. The border should be dug over deeply and farmyard manure or well-rotted vegetable refuse compost should be added at the rate of one good barrow-load to 10 sq. yds. When farmyard manure is not available, damped horticultural peat should be used, or straw may be dug in vertically, while bastard trenching. Straw dug in in this way helps to aerate the lower soil and this increased aeration keeps the bacteria working and assists in watering. See that the subsoil is flooded by soaking the bottom of the trenches as digging proceeds. A light dressing of hydrated lime should be applied on the surface at 4 ozs. to the sq. yard.

Before planting, care should be taken to see that the soil is at a temperature of not less than 58 deg. F. When plants are put in soil of a lower temperature, the roots die, and though the plant may recover the cropping capacity is seriously lessened. To ensure this, the house should be heated for at least a fortnight before planting.

A hole should be made with a trowel large enough to accommodate the plant and pot. The plants should stand in their holes still in their pots for two or three days before being knocked out, and by this time the roots of the plants will have become acclimatized.

The plant may then be knocked out of the pot and dropped into the hole, and pressed down firmly so that the top of the ball is just below the level of the soil. Never put loose soil around the collar of the plant because it is through this loose soil that the wireworm can work and do damage. If the ball of soil is exposed and hard, wireworms cannot get through.

The plant may best be removed from the pot by turning it upside down and passing the stem between the second and third fingers of the left hand. The rim of the pot should then be tapped sharply on the bench or on a stone and the ball of roots

will be freed. The pot can then be taken off with the right hand and put to one side when of course the actual operation of putting the ball of soil in the hole provided can proceed.

Watering after planting. The plants should be watered for two or three days after planting and again a week later. This should be done with a can and a fine rose on the end. After this, the plants in the border should not be watered for a considerable time. In a well-prepared border no water should be necessary until the flowers of the second flower truss are opening in six or seven weeks' time. If water is given earlier, the plants are apt to "run away," and they thus put all their energy into making foliage growth rather than fruit.

In pots and boxes, watering may be necessary every two days, it much depends on conditions. The ideal is only to water the plant when it really needs it.

When a plant wants watering it has a distinctive appearance. It starts looking dull and grey, the leaves may start to droop.

Ventilation. It should be possible to ventilate during the day, and everything should be done to keep the air buoyant. The temperature should not drop below 60 deg. F. for this reason.

Initial manuring. In addition to the properly composted vegetable refuse or farmyard manure dug in at one good barrow-load to 10 sq. yds., a dressing of complete organic fertilizer like ground hoof and horn, or fish manure, should be used at 4 ozs. to the sq. yard.

Planting in pots or boxes. If tomatoes are to be grown in pots, boxes or troughs the soil which may be made up similar to the John Innes compost No. 2, should be placed in position a week or so beforehand to warm. The plants intended for this treatment should be grown on for three or four weeks in their 3-in. pots and may then be potted on into 5-in. pots for a similar period. After this they should be ready for transference into their final home, a 10-in. pot or of course a box or trough. John Innes Research Station experiments seem to show that plants may be put directly into their final pots with equally good results as when given so many potting "shifts."

When transferring, it is important to disturb the root system as little as possible. Care should be taken to carry out the instructions given on potting on page 54.

The pot, box or trough should never be filled higher than 4 ins. from the top so as to allow of top dressings being added later. Planting should be done as advised for the border.

Water carefully in the early stages, or soft growth will result. It is better not to water till the first truss has set and to try and keep the plants going by syringings overhead until this period. Feed when the first two trusses have set with Liquinure, Tomato Special, in accordance with instructions on the bottle. A weekly dose will usually be necessary. Stopping may be done at the third or fourth truss if there is no further room for the tops of the plants, or if they are to be used as a catchcrop.

Top dressings in the border or pot. The plants for the border may be given a top dressing every 14 days consisting of muriate or sulphate of potash at 1 oz. to the sq. yd. and dried blood at $\frac{1}{4}$ oz. to the sq. yd. This mixture may be mixed together beforehand. Those who wish to buy an organic compounded fertilizer like Cornish Fish should insist on its containing 10 to 15 per cent of potash and nitrogen 5 per cent to 6 per cent. (This may not be possible under certain war-peace conditions.)

When the plant has grown and the fifth truss has set, a more complicated dressing may be given, consisting of one part of muriate or sulphate of potash, 3 parts superphosphate and 5 parts dried blood. This may be applied at 3 ozs. to the sq. yd. Again there are special organic fertilizers compounded for the purpose. After this the plants should show considerable vigour and the normal top dressing may be resumed again. In the pot when two or three clusters of fruit have set, a top dressing of the John Innes Compost No. 2 may be given. This means applying 2 inches of soil. Six weeks afterwards another such top dressing may be necessary, and after each application a good watering should be given to settle the soil.

Pot plants always require more watering and manuring than plants in the border. When the plants are growing it is often

necessary to water every day, and it is advisable to add to the water twice a week the Liquinure (Tomato Special).

Training. The rows of tomatoes in the house may either run across or lengthwise and whichever method is adopted wires should be stretched tightly along the ground from one end of the house to the other so that these can be used for anchoring the trellis or string up which the plants may be trained. It is quite easy then to make the holes with a dibber or planting tool ready to receive the tomatoes. When planting across the house it is usual to have double rows, *i.e.*, two rows 18 ins. apart with 15 ins. between the plants and then a space of 27 ins. between the next pair of rows. A main pathway should run down the centre of the house.

Fix a 12-gauge wire overhead and tie the 4-ply fillis or string from the top wire to the bottom wire and as the plant grows, twist it around the fillis. Another method is to put a bamboo or galvanized rod to each plant and tie the fillis to the short bamboo. It is a mistake to tie the string to the base of the plant as some gardeners do for then there is always the danger when working among tomatoes of pulling the plants up.

Temperatures. During growth the minimum night temperature should never fall below 63 deg. and never be above 75 deg. In bright sunny weather a higher temperature can be allowed than in dull weather. In bright weather the plants make starch. Plants make plenty of starch and if the temperatures are not kept up it is difficult to "move" them afterwards. The day temperatures in a tomato house should be from 63 to 65, but may rise from sun heat to 70 or even 80.

Ventilation. It is always better to let the temperature of the house rise and keep the plants cool by overhead syringing, certainly in May or early June. From June onwards it is usually possible to leave on a little ventilation even at night-time and to increase this in hot weather. Cladosporium or mildew (mould) invariably appears if the heat is cut off in June and the houses closed down early in order to try and conserve sun-heat. Always try and keep a little pipe-heat going plus ventilation, so as to ensure air movement. The doors at either end of the houses may be left open in the summer months

on calm days but never when strong winds are blowing. Winds cause injury to plants and dry out the soil. End-on ventilation is always useful especially at the " corners " of large houses.

Overhead damping. To ensure a good set, the atmosphere should contain a certain amount of moisture for the pollen to germinate. On bright sunny days syringing overhead may be done, but this is never advisable on a dull day. There is never any need to tap a plant in order to shake the pollen as so many gardeners advise.

Side shoots and stopping. The side shoots must be removed. Allow the first six to stay on the plant till they are 6 ins. long, as these assist in the development of the tomato in its early stages. Remove the side shoots by making them snap out. This can be done by giving them a sharp pull sideways. No stumps should ever be left to become infected with grey mould or this may encircle the stem and kill the plant. It is best to do the dis-shooting early in the morning.

It is always possible to train a side shoot up in place of the main stem if the latter gets damaged. Some gardeners prefer to grow their tomato plants on two stems and then of course they allow one of the lowest of the side shoots to grow naturally.

The practice of stopping is that of pinching off the growing point with the object of causing the lower trusses to mature earlier, and this is done say just above the fourth truss if very early fruit is wanted. As the total weight of crop is adversely affected it is not a practice to be encouraged. Stopping should therefore never be done till the plant has reached the top of the house, or at the latest about six weeks before pulling the plants out, whichever is the sooner.

Defoliation. The removal of leaves should always be done in great fear and trembling. The first operation is usually carried out when five trusses have set and then all the lower leaves between soil level and the first truss are cut off. A fortnight later it is possible to remove the bottom half of the leaves between the second and fourth truss but only if the foliage is very dense. One of the simplest ways of removing

these is to hold the stalk 2 ins. from the main stem and then to give a sharp pull upwards.

Never carry out indiscriminate defoliation but always feel free to cut off any leaves that start to turn yellow.

Syringing and watering. It is a good plan to syringe the plants overhead on bright days as this helps to distribute the pollen and so assists fertilization. Once the plants have got to their maximum height further overhead syringing should not be carried out. It is then that the top shoots should be given a little more freedom so that shade to the flowers and fruits is provided.

If adequate flooding has been done in the winter it will not be necessary to water for six weeks after planting, apart of course from the original ball watering as the plant is put into position. It is as well to reduce watering to a minimum in April as this reduces the soil temperature, and as a result root troubles may develop. Water so that the end of the hose or can is kept close to the soil to prevent the lower fruits becoming splashed, for when this happens diseases may result. Water in the morning if possible. From June onwards water once a week, though on the very dry soils, twice a week. When watering put on plenty, and if the surface becomes hard it should be broken up with a fork to allow the water to pass through.

Top mulching. It is a good plan to cover the surface of the soil with 6 ins. of straw or damped horticultural peat. This may be put on in May or early June. Peat is excellent because the plants may root into it.

Shading. In very bright summers a certain amount of shading may be done to the roof in order to prevent sun-scorch. The outside of the houses may be syringed over with a little lime-wash or some of the proprietary mixtures advertised for the purpose.

Varieties. Varieties that do well in some districts are often poor doers in others. Some varieties are specially suited to newly prepared land but are quite unsuited to land that has grown tomatoes for years.

A few varieties are therefore mentioned with brief descriptions and any new growers should try out two or three of

them to see which do best under their particular conditions.

Potentate. Liked by those who prefer a big tomato and do not much mind about shape. A very heavy cropping variety with foliage that does not spread out.

Vetomold. Introduced because of its resistance to Mildew (mould) (*Cladosporium*). Care must be taken to buy a good strain. This is a variety that needs rich soil if it is to do really well.

Clucas, Early Eclipse. Very early, of good colour. Throws fruits of medium size.

Television. Has a skin as thin as a cigarette paper, the fruit is ruby red and of excellent flavour. It crops well, is early, and a good keeper.

Ailsa Craig. Good growth with medium foliage. Free setting. Good trusses. The fruit is even in size and rich; leaves should be removed if necessary, and not parts of leaves. The defoliating helps to increase air circulation, but should not be done until absolutely necessary.

Victory. Free setter, smooth fruits, solid, contains little seed. The trusses are large and are borne at short intervals.

E.S.1. Introduced by the Cheshunt Research Station. A heavy cropper. Fruits of good flavour and medium size. Good for early or late work.

Stonor's M.P. Fruits of fine form and practically smooth. Fruits mature early, and are of good flavour.

Market King. A short jointed variety. A heavy cropper, producing good coloured fruits. Very popular in the north.

For early work in pots I can recommend Kondine Red and Potentate. For winter fruiting in pots, Ailsa Craig and Scarlet Knight.

For diseases, see Chapter XIX.

CUCUMBERS

The cucumber is one of the oldest vegetables known. It has been popular in China and Egypt for thousands of years, and is now grown by the million in this country.

To grow cucumbers successfully a great deal of atmospheric moisture is required. This makes the keeping of the woodwork of the house in perfect condition essential. It is always worth while painting the inside of the house every year, for not only does this preserve the wood, but kills resting disease spores and hiding insects. The wire supports, that should run the length of the house, should be 6 ins. apart. There should be a heating system installed which will always keep the house at a tempera-

ture of not less than 65 deg. F. at night-time even in the coldest weather. It is equally important to ensure perfect drainage because a considerable amount of water has to be used each season and it must be able to get away or root troubles will soon commence.

Propagation. The actual time of sowing depends on when the planting has to be done. In winter two months are allowed from the time of sowing to planting, and in the summer and autumn six weeks are sufficient. Thus a sowing made in mid-December allows for planting in the middle of February.

The seed should be sown in the John Innes seed compost (see page 52), the seeds being placed on their sides $\frac{1}{2}$ in. or so deep. The pots should be stood where there is plenty of bottom heat, a covering being made with glass and brown paper as for tomatoes. The temperature of the house at this stage should never be allowed to fall below 70 deg. F. at night-time.

Potting up. In ten days or a fortnight the plants may be potted up into 3-in. pots, the John Innes No. 2 Compost being used. Cucumbers should not be potted firmly, soil should just be consolidated around the seedlings but never pressed. Each plant should be inserted up to the seed leaf. A good watering should be given with water at the same temperature as the house, immediately afterwards. After this, watering need only be done when the soil appears dry, but this often means once a day! Good root development cannot take place in soil that is over-wet.

If the beds are not ready to receive the plants they should be potted on in 5-in. pots. This may be in a fortnight's time. The same compost may be used. The plants should be staked well before they start to flop over, and in five weeks' time from this second potting they should be planted out.

A humid atmosphere should be kept in the greenhouse all the time.

Preparation of bed. A cucumber bed should be made of material that will keep open for as long as possible. This is important because of the large quantity of water that has to be thrown about in a cucumber house and which tends to compress the soil.

A normal bed is made up of equal parts of stable manure and soil in alternate layers. Strawy stable manure should be used. The Cheshunt Research Station has shown that equally good cucumbers can be grown on beds made up of soil and straw.

The bed should be made a fortnight before planting, first a layer of straw and then a layer of soil and so on, three layers of each in all. The bed should be about 2 ft. wide, and should be well watered so as to wet the straw thoroughly.

The bed should stand on well-drained soil, or on a concrete base over which a layer of lime has been placed 2 or 3 ins. thick. This lime needs replacing every year.

Ventilation. Ventilation is rarely necessary, and air should be admitted with caution. In July the ventilators may be opened slightly on the leeward side to change the air in the house.

Temperature. The atmosphere of a cucumber house must never feel dry, and a brisk temperature must be maintained at all times. Damping down should be done night and morning, and syringing at midday. The night temperature should be about 70 deg. F., and in the day-time owing to sun-heat may rise to 90 deg. F. When damping down, a gallon of water is often used to every three plants.

Training. The cucumber should be trained up wires, no side growth or lateral being left on the young plant below the first wire. The main stem should be allowed to go up to the roof of the house, the laterals being stopped when the second leaf has been produced. New sub-laterals are then produced and these are stopped after the second leaf and so on. Flowers may be produced on the main stem. Cucumbers should never be allowed to develop here. All male and female flowers on the main stem should therefore be removed, and all male flowers on the rest of the plant. The males cause the cucumber fruits to swell and be less palatable.

Apart from this, all dead leaves should be removed, as well as all young fruits showing disease. A gardener should aim at having two fruit-bearing joints on every lateral, and not more than three breaks.

Top dressings. These should be given three weeks after

planting, and should consist in the first place of straw or strawy stable manure. A week later a top dressing of soil may be given all over the bed. The soil should be wheeled into the house at least twelve hours before it is required for use. Cucumber fruits usually come in flushes, and it is necessary to top dress after each flush.

Withholding water. As much harm is done to cucumbers by over-watering as under-watering. It is usually only necessary to soak the beds twice a week. If it is noticed that the young fruits that are coming on tend to damp off, water should be withheld for a week.

Shading. Shade should be given in very hot weather. Flour paste is best (then it can be used again), as the rays of light are not reflected back into the air as with lime wash. One 5-in. potful of ordinary flour will give 3 gallons of shading.

Varieties

Butcher's Disease Resister. This is the chief variety grown to-day because it is immune from the spot disease. It is a heavy cropper.

Excelsior Telegraph. Long, smooth and of good colour. A heavy cropper.

Her Majesty. Long, perfectly straight fruit of uniform thickness. Flesh, crisp and white.

Hurst's Marvel. Bears a handsome, smooth, even fruit with scarcely any heel. A heavy cropper.

The Apple Cucumber. Bears round fruits about the size of a large apple.

For pests and diseases, see Chapter X'X.

LETTUCE

Lettuces may be grown under glass in a cool house at almost any period of the year. Naturally they are usually grown during the months which it is difficult to obtain them outside. There are two main crops, the autumn and spring.

Lettuces are a good catch crop to follow tomatoes, and may be used as an inter-crop providing they are planted out before the tomatoes, as advised later.

A first planting is usually done between mid-September and mid-October so as to obtain well-hearted specimens during

December and January, while a second planting is often carried out in December and January for the purpose of cutting during February and March. It is always better to have a whole house of lettuce rather than to try and use them for inter-planting tomatoes.

The autumn crop. The seed should be sown on or about 15th September. Seed trays or shallow pans should be filled with the John Innes seed compost to within $\frac{1}{4}$ in. of the top. After watering thoroughly the seed should be sown. With the standard seed box 200 seeds are necessary, evenly spaced.

A small quantity of the same compost should be sifted over the seeds, and the boxes may then be covered with a sheet of glass and dark paper. Germination should take place in four days, and the glass and paper should then be removed.

During this time the boxes should be on the benches of a house kept at the temperature of about 60 to 65 deg. F. In eight days' time the baby seedlings should be pricked out into further seed trays (usual size) 54 seedlings per tray. The John Innes potting compost should now be used. The trays should remain on the bench in the glasshouse at a temperature of from 55 to 60 deg. F.

Preparation of border and planting. In the glasshouses where the lettuces are to be planted out, the soil should have been prepared ready for the tomato crop in the spring. The lettuce planting should take place the first week in October, the soil being on the compact side. The top $\frac{1}{4}$ in. of soil should be raked as fine as possible, all the surface stones should be removed, for these cool down more quickly at night than the soil round about.

After planting, the seedlings should be watered with water at the same temperature as the house, and through a fine rose. Care should be taken not to wet the leaves, so always hold the rose of the can low down in between the rows of plants.

Further watering may be done as required, and hoeing should be carried out regularly. If water is not given regularly, the lettuce plants wilt, and then the lower leaves touch the ground and are attacked by botrytis. If water is regularly given the

leaves stand up. Again it may be emphasized that the leaves of the plant should not be wetted, but only the soil.

Decaying leaves. All decaying leaves, drying leaves and so on should be removed directly they are seen, with the sharp blade of a knife. These may be infected with a serious form of botrytis. The leaves should be burnt immediately.

Temperatures. When the lettuces are growing, the temperature should not exceed 55 deg. F. at night-time. In certain cases, if it is thought the crop is growing too slowly, the temperature may be increased to 60 deg. for a fortnight, and then drop down to 55 deg. once more or perhaps even to 50 degrees.

Never attempt to force the crop. Always give ventilation on all favourable occasions. Have a little pipe-heat if you can and keep the ventilators open a little to maintain a buoyant atmosphere.

Hoeing. Hoe the soil between the plants two or three times in order to keep down weeds. Be very careful not to damage the plants when doing this work.

The spring crop. The spring crop should be treated in exactly the same way as the autumn crop, the seed being sown about 15th October. The seedlings should be pricked out as previously advised and the house may be planted up about 10th December.

Where an early crop of tomatoes is to follow, the lettuce should be planted 9 ins. apart, and in such a way that the tomato plants may be put out in between them, as they are growing, when the time comes.

Varieties

The best variety for work under glass is **Cheshunt Early Giant**. It is a large crisp cabbage lettuce of excellent texture.

Another variety that has done well in trials is **Golden Ball** with lighter coloured leaves, and **Loos Tennis Ball** and **Green Frame** are quite good types.

For spring plantings use **Green Frame** or **May Queen**.

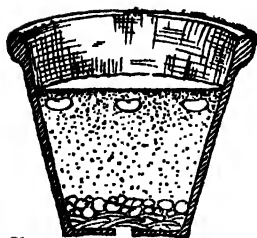
FRENCH BEANS

After the middle of September French beans have to be

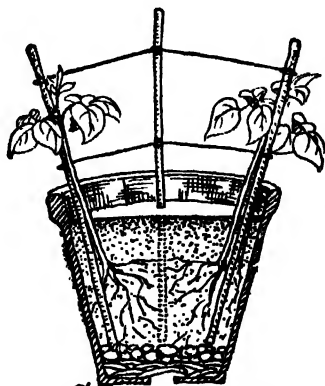
THE ABC OF THE GREENHOUSE
DWARF FRENCH BEANS



*Dwarf
French Beans
under glass.*



*Sow in 8" pots
(about 5 or 6 seeds)
leaving plenty of
room for top dressing.*



*Stake as soon
as plants
develop.*

grown in pots in the greenhouse. Ten-inch pots are usually most convenient, and these after being well crocked should be filled with the No. 2 John Innes Compost.

The pots should be filled three-quarters full and eight beans should be placed around the edge of each pot $1\frac{1}{2}$ ins. deep. If all the beans grow the number of plants should be reduced to five. It is most important not to water the soil after seed sowing. The beans germinate much better and do not "damp off" if the compost is kept on the dry side.

As the plants progress more of a similar compost may be added until the soil reaches within 1 in. of the top of the pot.

General management. The plants should be syringed twice a day to ensure that the flowers set properly and to keep down red spiders. When the first pods are formed a watering may be given with Liquinure (Tomato Special). This may be obtained from any horticultural sundriesman. Further feeds may be given once a week after this.

In order to keep the plants up, some twiggy sticks may be pushed into the soil, and these give the necessary support. The house should be ventilated whenever possible so as to ensure robust growth. Care should be taken not to allow draughts so that the plants do not get chilled.

Temperatures. The temperature of the house should be from 55 to 60 deg. F. at night-time during the whole life of the plants, but may be allowed to rise a few degrees during the day.

Varieties

The **Wonder** and **Black Prince** are the best glasshouse varieties.

CLIMBING FRENCH BEANS

Climbing French beans are an alternative to the Bush French beans and may be grown in the same way as suggested for them. The seed is usually sown in the narrow border where the plants are to grow, and the vines are trained on wires or strings close to the light. They may also be grown up strings or wires right the way through the house.

Whichever way the plants are supported they should be

thinned out so that they grow 9 to 12 ins. apart each way.

The earliest sowing, 8 per 3-in. pot, is usually done during mid-January especially in the South. In the North it is necessary to delay until the beginning of February, in some instances. Quicker results are achieved if the plants are raised in 3-in. pots and sown as advised for ordinary French beans. Planting is then done as for tomatoes (see page 76) to avoid a check in root development. In this case a light watering is given after planting to settle the soil around the ball of roots. Provide a string up which the plant is to grow and loop the top of the shoot to the string, tying it into position with raffia or green cotton "twist." Damp the plants twice a day as the season advances and give two feeds with Liquinure during the growing season. Be careful never to over-water or the roots will die off. Keep the plants free from red spider by syringing over regularly. Climbing French beans should always be pulled out of the house by late June and then a crop of late tomatoes may follow.

Varieties

The best variety of climbing bean is **Guernsey Runner** which seems to be synonymous with **Princess of Wales**.

RADISHES

Radishes may be sown on special beds made on the staging or directly in the border of the greenhouse. They do best in a low house because they are then not drawn so much. The border should be well worked, and should be rich in humus as the result of previous dressings of manure. The seed should be sown thinly, and not be covered with more than $\frac{1}{2}$ in. of soil made firm on the surface after sowing.

Seed sowing may be done any time between the middle of October and the middle of February. Radishes like plenty of water, and the greenhouse should be ventilated freely day and night once the plants have started to grow.

It is possible to take two crops of radishes in a greenhouse between the months of October and March. It is most important not to force, and the three essentials are light, air, and moisture.

Varieties

French Breakfast Early Forcing ; small top, very early, a bright scarlet.

Sparkler 50-50 , half-white and half-red, a very attractive radish for the salad bowl.

Turnip Brilliant, a bright scarlet with a white tip.

MARROWS

It is possible to grow a trailing variety of marrow as a catch-crop, the idea being to train the stems up the purlin posts in the houses. The plants are usually raised by sowing seeds singly in 3-in. pots and placing them on the staging of the house in the usual way. The plants are then set out as soon as possible at the base of the purlin posts where a special bed may have been prepared as for marrows in the open. When the flowers open, hand pollination is necessary to set the fruit and to do this the male flower is detached and the petals removed. The stamen is then rubbed over the stigma of the fruit-producing flower. As the flowers develop they are given some support by looping some fillis or raffia round the stalk of the fruit and tying it to the purlin posts. Side shoots that do not develop a marrow are completely removed.

Cut the fruits when they are 12 ins. long. You will usually get four good marrows per plant. Don't forget to water regularly directly the plants start to crop for marrows are 90 per cent moisture.

MUSTARD AND CRESS

May be sown in boxes on soil placed on the staging or even directly in the beds. An attempt should always be made to grow it and clear it in 14 days.

The best results are obtained when the soil is sterilized and the John Innes seed compost may be used. This should be made fairly firm and should be well watered.

When the bulk of the moisture has drained away the seed should be sown rather thinly and should *not* be covered with soil. The boxes may be kept in the dark for a few days or can be covered with brown paper.

The cress takes four days longer than the mustard and so should be sown four days beforehand. If there is sufficient heat the mustard seed should germinate within three days. After this it should be ready to cut in a week.

CAULIFLOWERS

Cauliflowers can be grown in the greenhouse in order to get a particularly early crop.

About September 15th the seed is sown on a prepared seed bed out of doors and covered with Continuous Cloches or a frame. When three rough leaves have developed the seedlings are potted into 3-in. pots using a John Innes No. 2 Compost. The plants are then kept in a cold frame or cold glasshouse. Meanwhile the soil in the greenhouse is prepared as for tomatoes (see page 76) and the plants are put out about the third week of January in rows 2 ft. apart, allowing 18 inches apart. Ball watering is done and from then onwards the temperature of the house must not fall below 48 deg. F. at night-time and must never go above 60 deg. F. by day. Water once a week, and be prepared to be liberal with ventilation if the weather gets warm. Syringe overhead on bright mornings.

Raising Various Vegetables for Planting Out.

The greenhouse can be used to raise large numbers of plants for planting out of doors later. This is not quite the book to give details of this, and those who are interested should read *The A B C of the Vegetable Garden* by the same author, published by the English Universities Press, at 5/-.

Onions, celery and leeks are sown in January and February, New Zealand spinach, aubergines and maize are sown in March, outside tomatoes and ridge cucumbers can be brought on ready for planting out in June. Peas, French beans and runner beans may be raised in boxes or pots and be planted out directly the weather is warm enough.

The keen vegetable grower will find many uses for a heated greenhouse.

CHAPTER IX

FRUITS UNDER GLASS

Answer these questions, please

1. How do I prune vines?
2. Do I thin peaches?
3. What is the best variety of fig?
4. How do I stop collar rot in melons?
5. How do I get early strawberries?
6. What about plums in a greenhouse?

THE glasshouse can be used for growing many kinds of fruit. Almost every known fruit has been grown in this country under such conditions. Many, like pineapples for instance, need special pits and heat, but large numbers like grapes, peaches and nectarines may be grown in any ordinary house given the proper care and attention.

VINES

The year 1938 saw a great return to grape growing under glass. The horticultural press devoted much more space to the culture of this fruit, and specialist farms started advertising extensively.

A stronger wiring system is needed for vine rods than for tomatoes or cucumbers. High temperatures are not required except in the case of Muscats, when flowering. As birds may give trouble when the berries ripen the openings of the ventilators are usually covered with small meshed wire netting.

The border. It is always easier—on the whole—for an amateur to grow a vine in a border outside. Efficient drainage is absolutely essential, and when preparing the border, the gardener has to see that the soil will remain fertile for eight or nine years. The roots of a vine should always be attracted to the surface and not into the subsoil.

Preparation of border. The soil should be taken out to

a depth of $2\frac{1}{2}$ ft., the bottom of the hole being then filled in with a 6-in. thickness of broken brickbats, etc. The brickbats should be covered with a 2-in. thickness of good turf laid grass side downwards, or damped horticultural peat and these in their turn should be covered with a $\frac{1}{2}$ -in. layer of crushed bone. The remaining 2 ft. may be filled in with a compost consisting of : 6 parts good soil, 2 parts well-rotted old farmyard manure or composted vegetable refuse, 1 part well-rotted leaf mould, $\frac{1}{2}$ part wood ashes or burnt refuse, $\frac{1}{8}$ part of bonemeal, $\frac{1}{8}$ part of mortar rubble or ground chalk, and $\frac{1}{8}$ part charcoal. The ingredients should be mixed well together before being used.

The hole should be filled in evenly and trodden down firmly.

Propagation. It is possible to propagate vines by means of cuttings taken from well-ripened one-year-old laterals. These cuttings should be of a length to contain about four buds. They should be struck in sandy soil in a greenhouse at a temperature of about 65 deg. F. It is possible just to take one bud or eye off a lateral and plant it in the centre of a pot of soil in January or February so that the eye is exposed and the piece of wood at the base just buried. When the cuttings or eyes are well rooted they are usually potted on to 6- or 8-in. pots and it is in these latter that they will finish their first year's growth.

They are well ripened off in the late autumn and remain in a cold house until the beginning of the second year. They are then cut back to within two buds of their base. When growth starts, water should be given and the night temperature should be kept at about 55 deg. F. At the end of the second year it is usually advisable to pot into 12-in. pots, or to set the vines out in their permanent position.

Planting. Two or three-year-old canes may be purchased, and if they are to be restricted to a single rod they may be put in as close as 3 ft. apart. Where a rod is eventually going to be allowed to grow naturally it may need up to 20 ft. of room.

Planting may take place in the autumn or in late March or early April. In the former case the vine should be planted without disturbing the roots, and in the latter case the soil should be shaken out so that they can be spread out carefully.

General cultivation—first year. The soil of the bed

should be kept moist but not too wet, and a humid atmosphere should obtain in the house. Ample ventilation must be provided especially during hot dry weather, or weak growth will result. First thing in the morning and first thing at night, the vine should be syringed over. It may be necessary to damp the house down during the day as well, should the weather be warm.

The first year's growth should be about 8 ft., and this should be stopped towards the end of August. As the foliage shows signs of ripening water should be withheld. In December the rods should be cut back to within 6 ft. of the ground exactly above a good strong bud.

Second year. The rods should be untied in February and allowed to bend over so as to ensure that the buds break evenly. When growth has commenced it should be tied back to the wire again. The border should be given a good watering in March.

Two or three growths should now be seen at each eye. The smaller ones should be rubbed out, and the main one left to grow on. Fruit sometimes shows on these, but should be rubbed out.

When these breaks grow to about 1 ft. in length they should be stopped, and the side growths which form afterwards should be cut to two joints. The end growth or leader should be allowed to grow naturally.

Third year. This should be the first fruiting year.

All the side growths should be cut back to one well-developed eye, and the leader reduced by about half. The rod should be allowed to bend over as before, and the weaker growths rubbed out after the rod is tied back again. (See second year.)

Every lateral should be showing fruit this year, but only eight bunches in all should be allowed. Heavier cropping than this ruins the constitution of the young rod.

Subsequent years. Each year the vine should be pruned in the winter by cutting back the laterals to one good plump bud, and the leader by half or a quarter as desired. After this the rod should be painted over with a 5 per cent solution of a good tar distillate wash.

As the side growths develop in the spring, they should be stopped at two joints beyond the bunch of fruit or at one joint if there isn't space for a greater extension. The tendrils should be pinched off at the same time. The secondary shoots which grow out as a result of such a stopping should be pinched immediately beyond the first leaf and so on again and again throughout the season as they continue to grow.

The leading shoot of the vine is exempted from being stopped when the rod is young, but is often pinched when the rod has grown to the top of the house.

Temperature. The temperature of the house when the vine starts to grow should be between 50 and 60 deg. F. The temperature should rise gradually until it reaches a temperature of 70 deg. by the time the vine is in flower. When the grapes are set the temperature may again be lowered to 60 deg. until after the stoning period is passed. Then the temperature may rise again to 70 deg.

When the grapes begin to colour the temperature should again be dropped to 65 deg. F. and in cold weather it is always better to have a slightly lower temperature than to maintain a high one with over-heated pipes.

Ventilation. Ventilation not only helps to control the temperature, but admits fresh air. Vines require little ventilation in the morning, but this may be increased as the day advances, the house being closed by stages in the afternoon, until the ventilators are shut right down in order to trap some of the sun-heat. Vines need air when the grapes are starting to colour, and it is only then that the ventilator should be opened day and night.

Watering. It is most important to flood the vine border thoroughly each winter. It is surprising how much water the border will take, and in order to ensure that the subsoil is well wetted it may be necessary to give 200 gallons. During the growing season the plants must have a sufficient supply of water also, a good flooding being given before flowering and another after thinning. In fact the border should be kept well watered until the grapes start to colour and ripen.

Feeding. Once the berries are thinned feeding should

be liberal and Liquinure (Tomato Special) may be given once a fortnight when any watering is done.

Every winter after removing any loose strips of bark from off the rods and painting with a tar distillate wash a liberal mulching of well-rotted manure or composted vegetable refuse should be placed over the borders.

Winter work. The vinery should be cleared of all fallen leaves and the leaders shortened back. When young this will mean leaving about 4 ft. of growth and when the rod has reached the top of its allotted span it will need cutting back almost entirely. When the loose bark has been pulled off the rods and the tar distillate wash applied to them all the prunings and other debris may be removed before the mulching of dung or vegetable refuse is put on as advised above.

Pollination. It is usually advisable to tap the rods in the middle of the day, when the plants are in flower, in order to distribute the pollen. In the case of Muscats the temperature will have to be raised and this usually means closing the ventilators for a few hours in the middle of the day. The atmosphere must always be kept charged with moisture during this time, but when fertilization has been completed the temperature may be reduced.

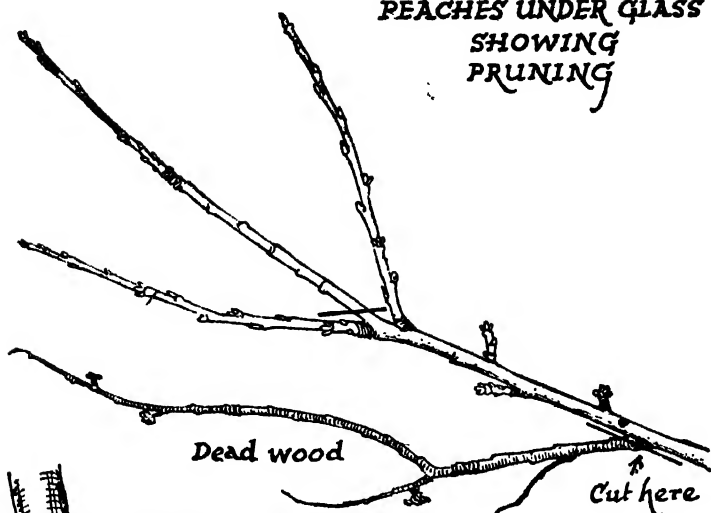
Moisture. The rods will need spraying regularly with clean water at the same temperature as the house in the early stages to cause the buds to break freely, and in the later stages to keep down red spider. Syringing should be discontinued as the vines come into flower, and again later as the grapes start to colour. Open the vents early to dry off the moisture on the berries before the sun gets on them.

It is important to syringe regularly after the grapes have been cut.

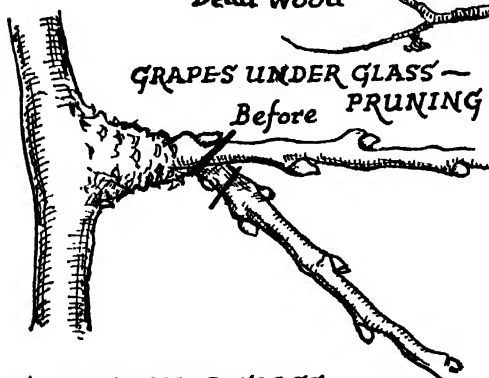
Thinning. Three times as many berries are produced on a bunch as can ever come to perfection. If they are all left to develop the berries get jammed, the inner ones may rot, and the bunch will be spoiled.

Thinning should be done with care for the berries should never be handled nor should they touch human hair. A little forked stick should be made to hold the berries out, and the

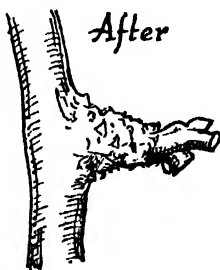
PEACHES UNDER GLASS
SHOWING
PRUNING



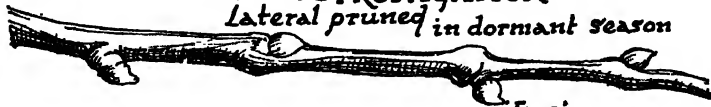
GRAPES UNDER GLASS—
Before PRUNING



After



GRAPES UNDER GLASS—PROPAGATION
Lateral pruned in dormant season



'Eye'
pegged into turf
or surface of flower pot
will readily form roots.

actual thinning should be done with a narrow pair of long pointed scissors.

Two thinnings are necessary, the first when the grapes are the size of sweet pea seed, and the second when they are the size of marrowfat peas. The inner berries should be cut out first, then the small berries, then the side berries. In the case of the larger bunches the shoulders should be tied up with raffia.

Stoning. The stoning period usually lasts two or three weeks. If too much water is given at this time the skin of the berries may crack. The house needs ventilating but draughts must be avoided, and the rods should be syringed.

Varieties

BLACKS

Madresfield Court. Muscat flavour, berries very large. Free setter.

Black Hamburg, a good early grape, first class quality, usually easy to grow.

Gros Colmar bears larger berries than the Black Hamburg, and of excellent appearance too. The flesh is of poorer quality. A late variety.

Alicante. A very free fruiter, excellent keeper. Has good appearance and a robust constitution. A late but not particularly well-flavoured grape.

WHITES

Muscat of Alexandria. Probably the most handsome and valuable grape in cultivation. First-class quality. Late.

Buckland Sweetwater. Makes a good pair with the Black Hamburg, for it needs the same treatment. Early, showy, and handsome. Flavour second-class.

PEACHES AND NECTARINES

As the nectarine is a smooth skinned type of peach these two are dealt with under one heading.

Fan-shaped trees with a short stem are usually grown on wires 1 ft. or 18 ins. away from the glass of the house, or against the back wall.

The border. The soil should be dug out to a depth of 2½ ft., the hole being 5 ft. long and 3 ft. wide. In the bottom of the hole a 6-in. layer of brickbats and coarse rubble should be placed, and above these turves should be laid, grass side downwards. The hole should then be filled in with the following

compost :—6 parts good soil, 1 part of mortar rubble or rough chalk, $\frac{1}{2}$ part wood ashes or burnt garden refuse, $\frac{1}{2}$ part bone-meal and $\frac{1}{16}$ part sulphate of potash or the wood ash content may be doubled

Planting. This should be done in the autumn, say October or November, care being taken to see that there is at least 5 ins. between the trunk of the tree and the brickwork. The roots should be spread out evenly and shallowly, and the soil should be trodden in firmly around it. Care should be taken never to bury the union of the stock and scion.

First year. The great thing in the first year is to get the tree firmly established. In January damped horticultural peat should be applied all over the ground to a depth of 4 ins. for 3 ft. around the stem of the tree. Pruning is done at the same time by shortening the shoots to half their length.

Manuring. Dried blood may be applied at 2 ozs. to the sq. yd. early in February. In November or December a good fish manure should be given at the rate of 3 ozs. per sq. yard. After the fruit has stoned a liquid feed may be given, Liquinure being used for this purpose.

Each year hydrated lime may be applied after the fruit is picked at the rate of 4 ozs. to the sq. yd. This will not be necessary if the ground is chalky.

Watering. *Plenty* of water should be applied in the spring and summer months whenever the soil gets dry. A good flooding is necessary in the winter too. The branches and leaves of the tree should be syringed after the fruit has set until the time when it begins to ripen. Syringing should continue after harvesting.

Pruning. Both the peach and the nectarine flower on the last year's well-ripened growths, and on a few short spurs. The pruner's main object is to try and furnish the tree with equal sized branches radiating evenly from the main stem.

The aim should be to produce the tree's lower branches first of all and then to allow the centre of the fan to be filled in afterwards.

The peach should be trained on wires which are securely fastened 4 ins. away from the wall. It is on to these wires

spaced 12 or 18 ins. apart that the growth should be tied after the trees have been pruned. In the winter the older growths are removed and the younger not over-strong shoots retained. The pruner should aim at a tree which has well-ripened young growths spaced 4 ins. apart all over.

Much pruning has to be done in the summer for from each young shoot retained in the winter large numbers of laterals grow out in the spring. Only three, or at the most, four of these should be kept, and the surplus should be rubbed out with the thumb and forefinger when they are $\frac{1}{2}$ in. long. A growth should be left at the base of each length of fruiting wood so that this may take the place of this wood when the fruit has been picked. The operation of dis-shooting should be extended over a period of ten days.

A tree that crops heavily makes less wood than a tree that doesn't fruit. Trees tending to make too much growth should be root-pruned.

Sometimes a shoot is left near a fruit for the purpose "of drawing the sap." This should be stopped at six leaves.

Pollination. All varieties of peaches and nectarines are self-fertile but it is best to help pollination by means of a rabbit's tail attached to a short length of bamboo. This is used to titillate the flowers.

Temperatures. The house should be kept at a temperature of about 50 deg. F. when the trees are in flower. After this the temperature should be increased to 55 or 60 deg. at night-time—gradually. During the day-time the temperature may rise to 75 deg. F.

Mulching. After flowering it is advisable to mulch with damped horticultural peat as suggested under the heading First Year (see page 100).

Thinning. After the fruits have stoned properly the fruit should be thinned so as to only leave 1 per sq. ft. in the case of peaches and 1 per 9 sq. ins. in the case of nectarines. This thinning is usually done in two periods.

General management. Surplus shoots are removed during the summer but growths required may be kept tied in.

Towards the end of the summer, full air should be admitted

night and day, so as to ensure the proper ripening of the fruit. Towards October water should be withheld gradually.

Nets should be placed in position to catch the falling fruit, the ripest being removed daily. When all the fruit has been gathered the house should be given a thorough syringing.

Varieties

PEACHES IN ORDER OF RIPENING

Duke of York. Large rich crimson of good flavour and tender flesh.

Peregrine. Large round fruit, brilliant crimson, very juicy and rich in flavour.

Bellegarde. Fruit large, golden yellow with a dark crimson flush, excellent flavour.

Sea Eagle. A large fruit, yellow with a crimson cheek. Excellent quality.

NECTARINES IN ORDER OF RIPENING

Cardinal. Round, scarlet, first-class flavour.

Early Rivers. Large light yellow with rich crimson flush. Excellent flavour.

Humboldt. Very large. Yellow with a crimson flush, very juicy and of good flavour.

Pineapple. A deep orange and crimson, fine flavour, perhaps the best flavoured of all.

THE FIG

The fig is interesting in that the flowers are born in a pear-shaped inflorescence, the so-called fruit is really a cavernous fruit stalk with an opening at the top. In this hollow receptacle the two kinds of flowers are borne, male and female.

Under glass, figs may be grown as bush trees in pots, or in the border, but are more often grown as fan-trained trees against the back wall, or on a wire trellis in the house.

Preparation. The soil should be taken out two spits deep and a 6-in. layer of rubble or broken brickbats placed in the bottom. These should be rammed down and are there to act as drainage and to help prevent the roots coming through into the subsoil.

The hole should then be filled in with good soil to a barrow-load of which has been added two large handfuls of bonemeal,

two handfuls of wood ashes and lastly a handful of ground chalk. This soil mixture should be made firm.

A border $3\frac{1}{2}$ ft. wide and $1\frac{1}{2}$ ft. deep should be quite good enough for a fig. A restricted root run seems to produce the right kind of short jointed shoot which crops heavily.

Starting into growth. In a house devoted to the fig only, it is usual to start the trees into growth about January. The night temperature should then be 60 deg. and during fine days may rise to 80 deg. midday with sun-heat.

The house should be syringed twice daily, in the morning and in the afternoon.

Stopping. When the side shoots have made four leaves, the growing point should be pinched out and all sub-laterals should also be pinched at four leaves.

The baby fruit which has set on last year's wood should soon start to swell and it is then that plenty of water should be applied. Twice a week feed with Liquinure in the water used for watering.

This first crop should ripen in June.

Second crop. A second crop should be produced on the young wood which has probably been stopped when 8 ins. long and should be ready to pick in August. A moist atmosphere should be kept up in the house by frequent syringing and the temperature may now rise to 90 deg. during the day with the sun. It may be necessary to shut up the house early in the afternoon to bottle up the sun-heat.

The most successful fig growers are those who keep the glass of the greenhouse perfectly clean, for an abundance of light is essential.

The three-crop system. Some growers like to take three crops a year and so they start the fig into growth in December, keeping the house at a temperature of 80 deg. Picking should then commence at the end of March. The second crop is borne on the current year's growth which ripens May and June. The third crop, usually small fruit, ripens in July.

It is important to try and restrict the root run of the fig or otherwise excessive growth results at the expense of fruiting. Never let the roots for instance run *outside* the house.

When the fruits start to swell feed with Liquinure (Tomato Special) at intervals of four days giving a good dose on each occasion.

Very little ventilation is necessary until ripening time but when the fruits start to colour air must be given. No syringing or damping down should be done directly ripening starts.

Pruning. The fig is most amenable to pruning and may be pruned as desired in the winter. The shoots should be thinned where necessary and the dead wood removed. A pruner should bear in mind that the first crop is produced on short-jointed, well-ripened wood of the preceding year's growth.

Varieties

Brown Turkey, perhaps the most popular because it is easy to grow. It is very fertile, the fruit has deep red flesh, juicy and sweet. **Negro Largo.** A mid-season variety with very thin skin. Black and shiny. The flesh is brown rather than red and has a particularly nice rich flavour.

Brunswick. Bears perhaps the largest fruits, the flesh inside being greenish and the outside skin quite pale green.

White Marseilles. An early variety. Fruit is pale green and the flesh inside like opal-tinted china. This is considered by the epicure to be the richest and sweetest flavoured kind.

THE MELON

The melon should be grown in similar manner to the cucumber (see Ch. VIII) and is quite a suitable crop for the low span roof greenhouse.

Propagation. The seed is usually sown the first week in January, though later sowings are possible. Three inch pots are chosen for this purpose, and after being cleaned and crocked are filled with the John Innes Seed Compost (see page 52). Two seeds are then sown per pot by pushing them in $\frac{1}{4}$ in. deep. If both germinate, the stronger plant of the two should be selected. It is advisable to warm the pots and the soil before sowing the seed.

The pots should then be stood over the pipes in a greenhouse or plunged in a hotbed up to the rim. They should be covered with glass and a sheet of brown paper and the temperature in the greenhouse should then be at 75 to 80 deg. F.

Directly the seedlings appear, the glass and paper should be removed and the young plant may then be stood on a shelf near the glass of the house.

Potting on. When the plants are 3 or 4 ins. high and are well rooted they may be potted on into 5-in. pots, the John Innes Potting Compost being used (see page 52).

Throughout the growth of the plant regular syringings should be done with water at the same temperature as the house, in order to keep the atmosphere moist.

Making of beds. In the greenhouse, the beds in which the melons are to grow should be made up some days before they are required so that the soil can warm up. It is usual to place in position a layer of turves, grass side downwards; on the turves a ridge 1 ft. high and 8 ins. wide of special compost is then placed, this ridge being made moderately firm. A similar compost as advised for the potting is suitable. The plants should be put in quite firmly 18 ins. apart, and a little stake put in next to them to keep them upright. It may be necessary to tie this stake to the first wire.

Some gardeners believe in putting a metal collar around each plant about the size of an ordinary circular tobacco tin. Instructions are then given that no one must water inside the collar, for what is known as collar-rot may take place if this is done.

Set the ball of soil in the bed so that half of it is above the soil level. Then as watering proceeds the soil of the ball will gradually fall away and the top of the roots are exposed. This does prevent collar-rot. When pots are cheap, the bottom of the pot can be knocked off and the plant then set in the soil, pot and all. The roots grow into the compost and no watering is done inside the pot.

Training. The plant should be allowed to run up to the second wire and should then be stopped to allow the side shoots to develop. Any that grow out below the first wire should be pinched back.

When the flowers have set, and the fruits are starting to swell, not more than two, or at the most, three melons should be allowed per plant. The surplus fruits should be removed a

few at a time, making certain to keep those which are approximately the same size.

Three or four laterals are usually taken on either side of the stem but further growth is restricted so as to prevent overcrowding.

Pollination. When five or six female blooms are fully expanded, pollen may be transferred from the male flowers by means of a rabbit's tail to the females. Bees may be allowed to work in a melon house, but *never* in a cucumber house. During the middle of the day when it is sunny a free circulation of air should be encouraged to help dry the foliage. This helps in pollination.

Temperature and watering. Tepid water should always be used. The collar should be kept dry, but apart from this the soil around the roots should be kept on the moist side.

Syringing may be done twice daily, and draughts should be avoided. On the whole, melons are kept dryer than cucumbers.

A little extra water may be given as the melons come into flower, but this should be discontinued as the flowers open. At this time syringing should only be done once—in the afternoon. When the fruit show signs of changing colour withhold all moisture, and give free ventilation.

From planting date until the ripening of the fruits the temperature of the house should be 70 deg. F.

Manuring. As the roots appear through the compost, top dressings may be given of good soil mixed equally with well-decayed farmyard manure. This compost should be left in the house for a day to get warm.

When the fruits are swelling Liquinure (Tomato Special) may be given at the rate of 2 gallons of feed per three plants once a week.

Some gardeners prefer to give dried blood twice at intervals of 14 days from the time the fruits are the size of cricket balls.

General remarks. The fruit as it ripens should always be supported by nets. It is about then that the humidity and temperature may be reduced and water to the roots also.

January sowings ensure a good crop from the first week of

May onwards, and June sowings from the end of August onwards.

Varieties

Blenheim Orange. Scarlet-fleshed. Has thick flesh, will usually do under slightly cooler conditions than other varieties.

King George. Scarlet-fleshed. Good cropper.

Scarlet Hero. May be described as a scarlet form of Hero of Lockinge.

Emerald Gem. Green-fleshed. Handsome fruit. Superb in flavour, of a rich green colour.

Hero of Lockinge. White-fleshed. Handsome fruit, with white lacing evenly laid on golden ground. Extremely rich in flavour.

Superlative. Scarlet-fleshed. Medium sized, almost round. Delicious flavour.

STRAWBERRIES

Strawberries out of season are always attractive, though they perhaps have not quite the flavour of those grown outside.

Propagation. The runners required should be from healthy vigorous parents and from a good strain. Royal Sovereign is probably the only variety that is worth forcing, and the strain Malling 47 the best.

The parents should be set out in August or September and are thus established before the winter sets in. In late March they are given a dressing of meat and bonemeal at 3 ozs. to the sq. yd., and sulphate of potash at 1 oz. to the sq. yd. When the blossom trusses develop they are removed and soon after this the runners should begin to appear.

Three-inch pots should then be soaked in water for two or three hours and after crocking should be filled with the John Innes Potting Compost (see page 52). The soil should be firm, sufficient space being left to allow for watering. A drill should then be drawn V-shaped and 3 to 4 ins. deep down one side of each row of the parent plants. A continuous row of pots should then be placed in the prepared drill. The drill should then be filled in so that the pots are level when plunged.

As the runners develop one should be pegged into the top of each pot with wire pegs like hairpins.

When the runners are well rooted they should be severed from their parents, and a week later they may be potted on into 5-in.

pots using a similar compost. The 3-in. pots should be watered thoroughly before potting and if earthworms are suspected a quarter of an ounce of corrosive sublimate should be dissolved in three gallons of water to kill them. Care should be taken for this chemical is a deadly poison, and as its name suggests is corrosive to metal containers.

Each plant should be so potted that the crown points to the *edge*, and so that the plant itself is toward the edge. Firm potting is essential. For a week these pots should remain in the shade and afterwards may be stood on a good ash base in full sun.

Summer work. The pots on the ash beds should be syringed night and morning, and Liquinure (Tomato Special) in solution may be given twice a week at first and later every time the plants are watered, $\frac{1}{4}$ oz. is sufficient for a $2\frac{1}{2}$ gallon can of water. The pots should be arranged so that all the crowns point south and stood sufficiently far apart to ensure that the foliage doesn't overlap.

Autumn work. During the third week of October, the pots should be laid on their sides and a fortnight later the plants should be placed in a cold frame plunged in peat moss. If this is not available the pots should be stacked on their sides in tiers against the wall, ashes being used to keep the pots level. The crowns should point outwards from the wall.

Winter work. Early in January the plants may be taken into the greenhouse at a temperature of 40 to 45 deg. F. at night and 50 deg. F. during the day. Strawberries must be forced slowly until they are well into flower. Three weeks later the plants should be dipped in a 3 per cent solution of lime-sulphur, and afterwards $\frac{1}{4}$ in. of top soil should be scraped off each pot, and this should be replaced with some warm John Innes Potting Compost.

The plants should be syringed once a day for the first fortnight and twice a day afterwards.

When the plants come into flower the temperature should be raised to 55 deg. F. at night and 65 deg. F. in the day. Hand pollination should be done with a rabbit's tail.

The fruits as they swell should be thinned, not more than ten

to fifteen berries being left per pot. Each fruiting truss should hang over the edge of the pot, and this is the advantage of potting the crown well to the side.

Forcing. When the fruits start to swell the temperature may be raised to 65 deg. at night-time and 70 deg. or even more during the day. It is still necessary to syringe the plants twice a day until the berries start to colour, when such spraying should be discontinued. When the fruits start to colour a little liquid manure may be given. Liquinure (Tomato Special) is ideal for this purpose. The pots will need watering almost daily in addition.

General remarks. It is possible to force strawberries by bringing them into heat before Christmas, but really heavy crops are never produced if this is done.

Varieties

Royal Sovereign is the best variety for indoor work. Try and get the strain *Malling 47*.

POT FRUITS

It is possible to grow apples, cherries, pears and plums in pots under glass, indeed, vines, figs, peaches, nectarines and apricots may be grown in this way also.

Trees in pots are portable and can be moved whenever necessary. The pot should be stood on bricks so as to leave the drainage openings clear and the trees are then completely under control. A great variety of fruits may be grown successfully in one house, the trees being taken outside once the fruit has been gathered.

The early varieties of apricots, nectarines and peaches are often carried outside to make room for plums, and later kinds. Thus a succession is provided for.

Rotation. A convenient rotation for a fruit house is pot fruits followed by pot chrysanthemums. The advantage of these two crops is that they neither of them need a great deal of heat. A 4-in. hot water pipe therefore in the front and the back of a lean-to will suffice, but the little warmth provided assists in the setting of the fruit and the swelling of the crop and

should be sufficient to exclude the frost at night-time in the case of the chrysanthemums.

Potting. Pots ranging from 10 ins. to 18 ins. are usually used, the compost consisting of two-thirds soil and one-third well-decayed manure; a little broken brick may be added for the stone fruits. The plants will not need annual repotting, and it should only be necessary to remove some of the loose surface soil and replace with the John Innes potting compost.

When trees require a shift they should be knocked out of the pots, the ball should be loosened, the longest roots shortened and the tree potted on into a pot one size larger. At each potting, sufficient space should be left below the rim for watering.

Temperatures and ventilation. The pots may be stood outside during the winter, and be brought in early in March, or they may, of course, stay in the house all the year. Once inside, the temperature should be between 40 and 45 deg. F. at night-time directly the blossoms are visible. From the fruit setting to the early part of June 50 deg. F. should be aimed at, and from June onwards the ventilators should remain open day and night until October or until the pots are stood outside to make room for the chrysanthemums.

Syringing. The pots should be syringed from the time the fruits set until they commence to ripen. The water used should be the same temperature as the house and should be applied vigorously. This is best done as the sun declines, but sufficiently early so that the foliage is fairly dry before nightfall.

Pruning and spraying. In a book of this character there is not the room to deal with pruning and spraying in detail, but full instructions will be found in the companion volume, *The ABC of Fruitgrowing*, by the same author.

CHAPTER X

FLOWERS UNDER GLASS

Can annuals make a good show, and if so

1. When do I sow them?
2. What compost do I use?
3. Do they have to be stopped or pinched back?
4. What is *Alonsoa*?
5. Are there South African annuals?
6. Is Cockscomb a flower?

ANNUALS

THE warmth and protection of a glasshouse opens up far greater possibilities for the flower grower who possesses one than for the less fortunate grower who does not. In this chapter we start with the Annuals, the easiest subjects but some of the most colourful and welcome, when grown out of season.

Subsequent chapters tell of bulb forcing, foliage plants and a host of lovely perennial pot plants—all possible to be grown to perfection by the keen glasshouse grower.

Annuals for the greenhouse decoration may be divided into two classes. There are the tender annuals which will be discussed in the second part of this chapter; and also many hardy and half-hardy annuals which succeed in pots and which may be forced in spring to flower from February till May. Spring sowings will also produce plants to flower in late summer or autumn.

Seed sowing. For spring flowering the seeds should be sown late in August or early in September, and for summer and autumn flowering one sowing should be made in March, and another at the end of April.

Probably the best plan is to sow the seeds straight into small pots, but they may be sown in boxes (with the exception of *mignonette*, which dislikes disturbance) and pricked off singly

into pots when large enough. Pots, two or three inches in diameter, should be crocked and half-filled with the John Innes No. 1 seed compost, which should be made fairly firm and watered well through a fine rose. When the surplus moisture has drained away, two or three seeds should be sown in the centre of each pot and lightly covered with some finely-sifted compost. The pots should then be placed in a cold frame or cool house and covered with sheets of glass and brown paper until germination has taken place.

As soon as the seedlings show above the soil, the paper and glass should be removed, and the pots gradually introduced into strong light, when they should be placed on shelves in a cool house near to the glass, or the autumn-sown ones may remain in a cold frame until October. When large enough they should be thinned down to one per pot, retaining the strongest and most healthy-looking in each case.

It is important that annuals should not be starved in their early stages. As they grow, they should be top-dressed gradually until the pots are filled with compost to within about $\frac{1}{2}$ in. of their tops. When the pots are comfortably filled with roots they should be potted on into their flowering pots, 5 or 6 ins. in diameter. The compost used this time should be the John Innes potting compost No. 2.

Pinching. The seedlings should be pinched back two or three times to promote bushy growth, except in the case of stocks, salpiglossis, mignonette and scabious which branch more or less naturally.

General Culture

Autumn-sown Annuals. During the winter the roots should be kept only just moist, and the atmosphere as dry as possible, otherwise the seedlings may damp off. Remove all dead leaves also. When the pots are filled with roots the plants should be fed once a week with Liquinure (Flower Special). When the flower-buds appear in spring, water may be given freely.

Spring-sown annuals. These plants will be growing fairly vigorously from the seedling stage, so will need plenty of

water, and should be grown in houses which are well ventilated. As soon as the flowering pots are comfortably filled with roots a weekly feed will be beneficial as for the autumn-sown plants.

Staking. The dwarf kinds will, of course, need no staking at all. Tall plants can be neatly staked and tied with raffia, while those of medium height are easily supported by twiggy stakes.

VARIETIES

Alonsoa

Dwarf, half-hardy annual, 9 to 12 ins. high, with scarlet or pink flowers. *A. Warscewiczii compacta* is a scarlet, while *A. mutisii* has pink flowers with deep crimson centres.

Antirrhinum

Strictly a hardy perennial, but much use is made of it in pots. The colours range from white, through all shades of yellow, orange, pink and red to deep, almost black, velvety-red. The tall varieties grow about 3 ft. high, and intermediate kinds from 15 to 18 ins.

Clarkia

These often attain 4 ft. or more, when well grown in pots under glass. Large double flowers may be obtained in white and various shades of pink and red.

Godetia

Hardy annuals with fairly large single or double flowers, white or various shades of pink, mauve or red. The taller varieties, growing about 3½ ft. high, are usually grown under glass.

Larkspur

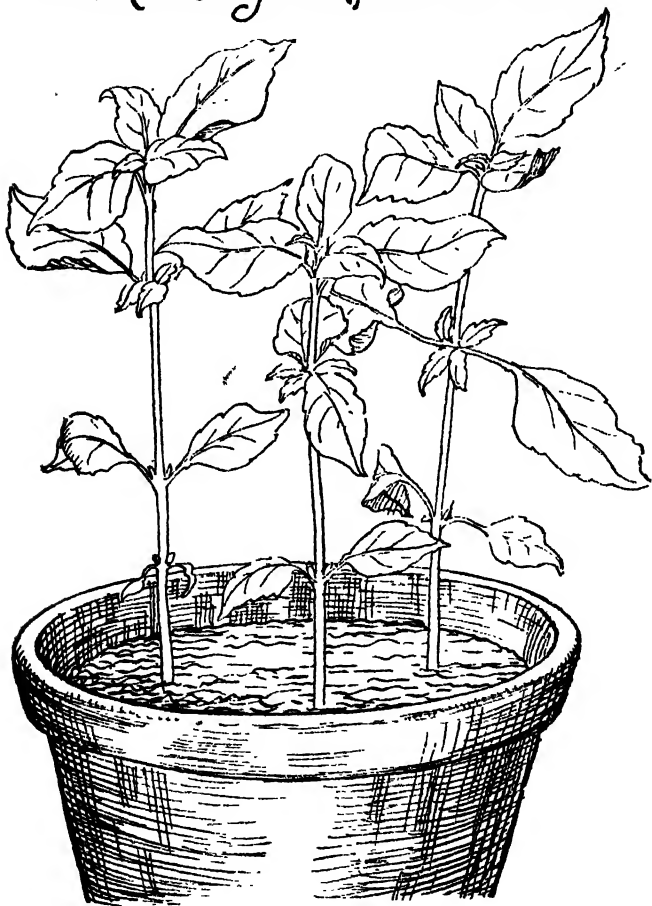
The stock-flowered type, growing about 4 to 5 ft. high, makes excellent pot plants. The flowers are double, and white, pale pink, salmon-pink, rosy-scarlet, mauve or blue in colour.

Mignonette

Popular, sweetly scented flowers, growing 18 ins. to 2 ft.

**ANNUALS POTTED 3 IN A POT
FOR BEST MASS OF COLOUR**

Clarkia elegans (potted in October)



high. The best varieties include the machet and special pot kinds.

Nicotiana

These plants with scented flowers may be grown in the shady part of the house and are especially fragrant in the evenings and early in the morning. *N. affinis* has large white flowers and grows about 3 ft. high; there are also pink and red varieties. A dainty variety is *N. suaveolens* with smaller delicately-scented white flowers.

Nemesia

Half-hardy annuals growing 9 to 12 ins. high. Large-flowered varieties may be obtained in white, blue or various shades of yellow, orange, pink or red.

Phacelia Campanularia

A showy dwarf hardy annual with bright blue, bell-shaped flowers, blooming within six weeks of sowing.

Petunia

The large-flowered single and double varieties are most suitable for pot work. The flowers are elegant and coloured white, pink, red, pale blue, violet, or they may be striped with various colours.

Rhodanthe

Charming half-hardy annuals with white or pink daisy-like ever-lasting flowers. They only grow from 9 to 12 ins. high.

Salpiglossis

Half-hardy annuals with large, ornamental, funnel-shaped flowers, delicately veined, and coloured brown and gold, blue and gold, red and gold, etc. They grow about 3 ft. high.

Scabious

Although really a biennial, the sweet scabious is normally treated as an annual. Growing about 3 ft. high, the flowers may be white, cream, pink, red, mauve or deep purple.

Schizanthus

Sometimes called the Butterfly Flower, this half-hardy annual is a valuable pot plant. The flowers are very freely produced and may be coloured white or various shades of yellow, pink, crimson, mauve or purple.

Statice

An everlasting flower that is very popular. There are various types, some like *Sinuata* which is rather stiff, and others like *Suworowii* which is "wavy" and light. There are blues and whites, rose colours, and purples.

Stocks

The half-hardy annuals include the ordinary 10-week stocks and the Beauty of Nice strains. The East Lothian and Brompton stocks are really biennials, though are often treated as annuals. The flowers are coloured white, yellow, pink, apricot, blue, crimson, mauve, or purple.

Ursinia

Half-hardy annuals from South Africa, only about 9 ins. high, with orange flowers. The plants should be placed in a sunny spot as the flowers tend to close up in dull weather, or towards evening.

Wallflowers

Although really a perennial and normally treated as biennial, there are some double varieties, 9 to 18 ins. high, which may be treated as annuals. If sown in July or August, they will flower early the following spring. Many beautiful colours may be obtained.

ESPECIALLY TENDER VARIETIES

BROWALLIA

Very free-flowering plants with blue, violet or white tubular flowers.

Time of Flowering. Winter or summer depending upon time of sowing.

Time of sowing. Spring for summer flowering in temperature of 55 deg. to 65 deg. F., July for winter flowering.

Position. Pots.

Temperature. March to June 55 deg. to 60 deg. F.

Feeding. Feed once or twice a week when the pots are filled with roots and the flower buds appear.

General management. Pot off seedlings singly when they are large enough to handle, and pot on as they require it. Pinch back three or four times to encourage dwarf, bushy growth. The plants from the July sowing may be grown in a cold frame until the end of September. When inside the plants should be syringed daily.

Species cultivated.

B. speciosa major grows about 2 ft. high and bears large bright blue flowers with a white throat. This plant is really a perennial, but is usually grown as an annual.

B. elata grows about 18 ins. high. Flowers may be blue or white.

CELOSIA (*Cockscomb*)

Decorative annuals with small flowers in feathery heads.

Time of flowering. Summer.

Time of sowing. March in a temperature of 65 deg. to 70 deg. F.

Position. Pots in full sunlight.

Temperature. 55 deg. to 65 deg. F.

Feeding. Feed once a week when the pots are filled with roots.

General management. When the seedlings are large enough, they should be potted up singly into small pots, and potted on fairly firmly as they require it. Careful watering is essential but the foliage should be syringed twice a day and plenty of air should be given whenever the weather is suitable.

Species cultivated.

C. cristata, the true Cockscomb, grows 6 to 9 ins. high. Several varieties may be obtained producing variously coloured flowers, such as white, golden, orange, rose and crimson.

C. plumosa is really a variety of *C. cristata* and grows between 1 and 2 ft. high. Various colours may be obtained, yellow, scarlet, crimson, orange-scarlet, and purple.

DIDISCUS (*Blue Lace Flower*)

A delightful pot plant, with heads of tiny blue flowers.

Time of flowering. July.

Time of sowing. February in a temperature of 55 deg. F.

Position. Pots in the sun.

Temperature. 45 deg. to 50 deg. F.

General management. Pot off the seedlings singly as soon as they are large enough, and pot on immediately the pots are full of roots, 5 or 6-in. pots are usually used as finals, and the plants may be watered freely as soon as they are well established.

Species cultivated.

D. coerulea, also known as *Trachymene coerulea*, grows about 18 ins. high.

IMPATIENS (*Balsam*)

Plants 18 to 24 ins. high with brightly-coloured flowers.

Time of flowering. Summer and autumn.

Time of sowing. From the end of March till the beginning of May in a temperature of 60 deg. F.

Position. In pots near the glass. No shading is necessary.

Temperature. 55 deg. to 65 deg. F.

Feeding. Feed two or three times a week when the pots are filled with roots.

General management. It is important to obtain seeds of a good strain from a reliable source. The seedlings should be potted off singly into small pots as soon as the first rough leaf appears. They must not be starved in the early stages, and should be potted on as soon as the roots touch the sides of the pots. No stopping is necessary. Plenty of water must be given, and the plants may be syringed frequently until the flowers begin to open. The flowering season will be prolonged if all blooms are removed immediately they wither.

Species cultivated.

I. balsamina. The improved Camellia-flowered strain is one of the best ; the rose-flowered strain has double flowers rather like tiny roses. Other colours which may be obtained include salmon-pink, white, violet and scarlet,

CHAPTER XI

BULBS AND CORMS

I like bulbs in bowls, so

1. Which can I grow?
2. Are gladioli easy?
3. What is the Cape Lily?
4. Can I try cyclamen?
5. What about freesias?

APART from the tender bulbs and corms, which will be dealt with in the second part of this chapter, many of the hardy and half-hardy bulbous plants take very kindly to pot culture. If subjected to gentle forcing they may be had in flower some weeks earlier than those in the garden outside.

Potting. Early potting is essential in order to be really successful with early flowers. Pots 5, 6 or 7 ins. in diameter are the most useful sizes for the majority of the bulbs, though smaller ones may be used for such subjects as crocuses, scilla, etc., and larger ones for some of the lilies. August and September are the usual months for potting such common kinds as narcissus, tulips, hyacinths, crocuses, irises, etc. Lilies, gladioli and tritonias may be started about November, or late gladioli in March or April.

The John Innes potting compost No. 2 is excellent for all bulbs. The pots should have the usual crocks and rough material at the bottom, and the compost should be moist and pressed round the bulbs fairly firmly. The larger bulbs, except lilies and irises, usually have the tips just above the soil surface, but smaller kinds such as snowdrops and scillas can be buried just below the surface. The pots should be stood outside on an ash or concrete base so that worms are prevented from entering through the holes in the bottom of the pots. They should then be covered with about 3 ins. of old sifted ashes, sand or fibre and left for at least 8 weeks. They will receive all the moisture they need from the rain draining

through the covering material, and will be kept at a fairly even temperature, and protected from frost.

Forcing. At the end of eight weeks or so, the pots should be examined, and the most forward plants taken into the greenhouse, the remainder being brought in in batches to provide a succession of flowers. They should be put in a cool house at first, and not in full light; after a day or two they may receive all the light possible and a temperature of 60 deg. to 70 deg. F. Plenty of water should be given while they are growing, and the temperature should be reduced slightly as they come into flower.

After Flowering. Bulbs are usually not suitable for forcing a second season, but are best planted out in a wild part of the garden where they will recover and establish themselves. If it is desired to keep any special ones, they should be stood beneath the staging and kept moist until the foliage dies down, then kept dry until time for repotting.

FORCING VARIETIES

The varieties most suitable for forcing are always indicated in bulb catalogues, and the few mentioned here are merely suggestions.

ALLIUM NEAPOLITANUM (*Daffodil Garlic*)

A white-flowered species growing about 15 inches high.

CHIONODOXA (*Glory of the Snow*)

Dwarf, early flowering bulbs with blue, white or pink flowers.

C. Lucillae 4 ins. high, flowers brilliant blue with a white centre.

There are also white and pink varieties, and the variety *sardensis* is gentian-blue with a white centre.

CROCUS

Baron Von Brunow, light purple flowers feathered with violet.
Gladstone, medium blue.

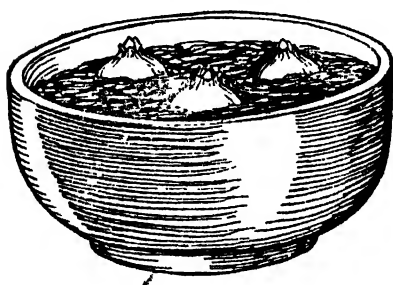
Kathleen Parlow, probably the best white.

Mikado, silver-lilac striped with mauve.

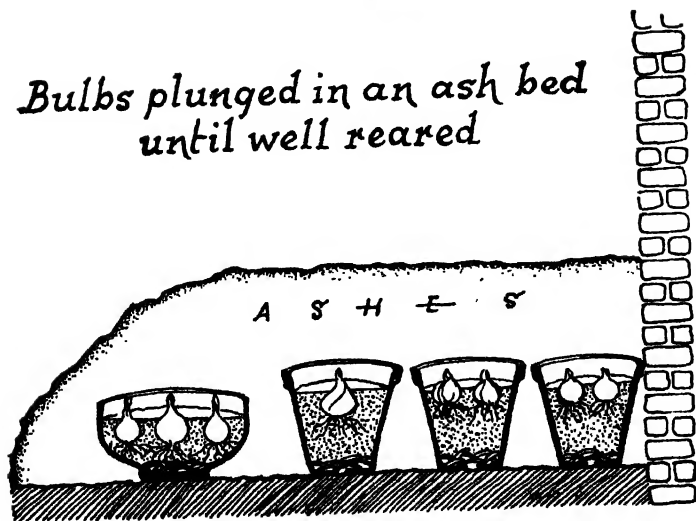
Striped Beauty, white striped with lilac.

Yellow.

BULBS
HYACINTHS IN FIBRE-
Tips left showing



*Bulbs plunged in an ash bed
until well reared*



GLADIOLI

Early flowering kinds grow 18 to 24 ins. high.

Blushing Bride, blush-white with a carmine blotch.

Brilliant, the earliest red.

Colvillei albus, The Bride, white.

Nymph, white with a carmine blotch.

Peach Blossom, delicate peach-blossom, pink blotched with cream and pale rose pink.

Spitfire, scarlet blotched with crimson.

HYACINTH

The early flowering kinds are more suitable for pot work than the late flowering kinds as they are lighter and more graceful. The Roman hyacinths are white and very fragrant. The Italian kinds flower about two weeks later and may be white, pink or blue.

Specialty prepared early Dutch hyacinths.

Bismarck, deep vivid mid-blue.

Electra, brilliant deep salmon-red.

Lady Derby, light rose-pink.

La Victoire, brilliant deep rosy-crimson.

L'Innocence, white.

Yellow Hammer, canary yellow.

Later-flowering varieties.

La Grandesse, white.

City of Haarlem, deep yellow.

Lord Balfour, purplish-mauve.

Myosotis, medium lavender-blue.

Vesuvius, brilliant scarlet.

Gertrude, rich rose with a deeper stripe down the centre of each petal.

IRIS

One of the earliest for forcing is *I. tingitana*, about 2 ft. high with lilac-blue, deep blue and yellow flowers. *Iris reticulata* is also early.

Dutch.

Golden Glory, canary yellow, golden yellow and orange.

Haring, white with lavender streaks and blotched with orange.

Hart Nibbrig, deep violet and azure blue with orange blotches.

Huchtenburg, silvery lavender and canary yellow blotched with gold.

Imperator, dark and light blue blotched with gold.

Rembrandt, blue blotched with orange.

LILIUM

Most lilies are suited for pot culture.

L. longiflorum Harrisii, 3 ft high with white flowers.

L. philippinense Formosanum, 2 ft. high and sweetly scented.

White shaded with reddish-brown.

MUSCARI (*Grape Hyacinth*)

M. armeniacum, 6 ins. high, with bright electric blue flowers.

M. Heavenly Blue, 8 ins. high, bright blue.

M. plumosum, 7 ins. high, violet feathery spikes of flowers

NARCISSUS

Polyanthus varieties. Several small flowers on a stem.

Paper white, white.

Soleil d'Or, yellow, early flowering and sweetly scented.

Poetaz varieties. Several small flowers per stem, but larger than the polyanthus types

Cheerfulness, double, creamy-white flowers.

Early Perfection, white with canary yellow cup.

Hellos, primrose yellow with canary yellow cup shaded with orange.

King Kraft, white with orange cup.

Laurens Koster, white with golden yellow cup.

White Hybrid, white with orange cup.

Trumpet varieties.

Emperor, deep primrose with golden-yellow trumpet.

Golden Spur, golden-yellow.

King Alfred, large golden-yellow flowers.

Principes, primrose yellow with golden-yellow trumpet.

Spring Glory, ivory-white with deep golden trumpet.

Tresserve, canary yellow with frilled golden-yellow trumpet.

Barrii varieties. These varieties have fairly deep cups.

Bath's Flame ; Brilliancy. Canary yellow with deep yellow cup flushed with orange-scarlet.

Charles, pale yellow with bright orange-scarlet cup.

Early Surprise, ivory-white with canary yellow cup flushed with orange-scarlet.

Lady Moore, creamy-white with orange-yellow cup edged with orange-scarlet.

Sunrise, white with a vivid orange cup

Poeticus varieties. White fragrant flowers with orange-scarlet cups.

Cassandra; Eagle. Large flowers.

Glory of Lisse.

Homer.

Ornatus.

SCILLA (*Siberian Squill*)

S. Sibirica, 3 ins. high, with bright blue flowers, several on one stem.

TRITONIA (*Synonym Ixia*)

T. crocata, 8 to 10 ins. high, with several orange-yellow flowers, on each stem

Prince of Orange, brilliant orange-scarlet flowers.

TULIPS

Single early varieties, about 12 ins. high.

Brilliant Star, dazzling vermilion scarlet.

Couleur Cardinal, rich deep crimson-scarlet.

Diana, white.

Duc van Thol, scarlet and orange-yellow.

Flamingo, deep bright carmine rose flushed with white.

Gold Prince, deep canary yellow.

Le Natelas, cerise pink flushed with creamy-white.

Double early varieties, 10 to 14 ins. high.

Azalea, clear carmine pink shaded with silvery-pink.

Couronne d'Or, bright golden-yellow shaded with rosy crimson.

Murillo, rose pink.

Rubra maxima, deep crimson-scarlet.

Electra, bright cerise carmine.

Darwin tulips.

Bartigon, brilliant deep rosy scarlet.

Le Notre, deep rose pink, margined with silvery pink.

Phillippe de Communes, velvety black-maroon.

Zwanenburg, white.

William Pitt, bright crimson-scarlet.

William Copeland, soft lavender.

TENDER BULBS AND CORMS

Those mentioned under this heading also do quite well in the John Innes potting compost No. 2.

CRINUM (*Cape Lily*)

Handsome deciduous, bulbous plants. The bulbs are large and the lily-like flowers are borne on stems from 2 to 3 ft. high. The leaves are large and arching.

Time of flowering. April to October.

Propagation.

(1) Offsets at potting time.

(2) Seeds sown in spring in a temperature of 65 deg. to 75 deg. F. Seedlings take several years before flowering.

Position. Large, well-drained pots or tubs in a light part of the house. After flowering, stand outside until the autumn.

Temperature. March to September 55 deg. to 65 deg. F.

September to March 45 deg. to 50 deg. F.

Feeding. Feed established plants once a week during the summer.

General management. Re-pot bulbs in March every three or four years. Water freely in spring and summer, but very sparingly for the rest of the year. Store the pots on their sides during the winter.

Species cultivated.

C. Macowanii, flowers white and purple in autumn.

C. Moorei, flowers white and red from April to October.

CYCLAMEN (*Sowbread*)

Deciduous perennial flowering plants. The foliage is often marbled and marked, and the flowers are white or various shades of pink, crimson, cerise or salmon-scarlet.

Time of flowering. Winter.

Propagation. Seeds sown $\frac{1}{2}$ in. deep from August to November or January to March in a temperature of 55 deg. F.

Position. Pots in a cold frame from May to September, inside for the rest of the year, but shaded from the sun.

Temperature. 50 deg. to 55 deg. F.

Feeding. Feed once a week when in flower.

General management. Re-pot in July or August. The corm should always be partly above the surface of the soil. Water moderately and syringe until new growth begins, then freely until the plants have ceased to flower, then keep almost

dry from May to July. Best results are obtained from 1 year old seedling plants.

Species cultivated.

C. latifolium (Syn. *C. persicum*) is the parent of the numerous hybrids and varieties which may be obtained.

EUPHORIS (*Amazon Lily*)

Evergreen bulbous plants, 1 to 2 ft. high with white flowers.

Time of flowering. December to March.

Propagation.

(1) Offsets in June or July.

(2) Seeds sown in $\frac{1}{2}$ in. deep in February or March in a temperature of 85 deg. F.

Position.—Well-drained pots.

Temperature. March to September, 70 deg. to 80 deg. F.
September to December, 55 deg. to 65 deg. F.

December to March, 65 deg. to 75 deg. F.

Feeding. Feed twice a week after the flowering stems appear.

General management. Re-pot firmly in June or July every three or four years. Water freely in spring and summer, moderately at other times. Syringe freely during the summer. Top-dress established plants each March with a rich compost.

Species cultivated.

E. grandiflora (Syn. *E. amazonica*).

FREESIA

Dainty, well-known bulbous plants with fragrant flowers of many colours.

Time of flowering. Winter and early spring.

Propagation.

(1) Offsets at potting-time.

(2) Seeds sown in cool greenhouse or frame in March or April, or as soon as ripe. Seedlings must not be re-potted their first year. May flower within six months of sowing.

Position. Pots in cool house.

Temperature. Never lower than 40 deg. F.

Feeding. Feed once a week when the flowers show.

General Management. Re-pot each year in August for January flowering, in October for February flowering, in November for March flowering and in December for April flowering. Bulbs should be put in 1 in. deep and 2 ins. apart. Stand in cool spot and give very little water until growth starts, then water freely until plants have flowered. Afterwards gradually decrease the supply and keep quite dry until July.

Species cultivated.

F. refracta alba, white and very sweetly scented. The variety *Leichtlinii* is creamy-white and orange. There are many beautiful hybrids including *Amethyst* (lavender-blue with a white throat), *Buttercup* (a rich primrose yellow shaded with orange), *Excelsior* (large cream flowers faintly blotched with yellow), *Jubilee* (lilac-pink), *Rosa Bonheur* (delicate pink with a bronze blotch), and *Wistaria* (violet-blue).

HAEMANTHUS (*Red Cape Tulip or Blood Lily*)

Deciduous bulbous plants from South Africa.

Time of flowering. Spring or summer.

Propagation. Offsets at potting time.

Position. Well-drained pots exposed to full sun while growing ; under staging when at rest.

Temperature. March to September 55 deg. to 65 deg. F.

September to March 45 deg. to 55 deg. F.

Feeding. Feed once or twice a week, when in flower.

General management. Re-pot immediately after flowering, but it is not advisable to disturb the roots too often. Pot up new bulbs in the autumn. Water very little till growth begins, then moderately till the plants finish flowering, and then freely as it is at this time that the bulbs make their annual growth. When the foliage has died down keep dry until growth starts again.

Species cultivated.

H. albiflos, white flowers.

H. Katharinae, red flowers 1 ft. high.

CHAPTER XIII

FOLIAGE PLANTS UNDER GLASS

Here I tell you about

1. The Redhot Cat-tail.
2. How to grow pineapples.
3. How to grow your own asparagus fern.
4. All about South Sea Laurel.
5. About a plant that eats insects.
6. What palms you can produce.

THIS chapter deals mainly with herbaceous plants grown for the sake of their beautiful ornamental leaves. Full details for the correct culture of each plant are given. The plants appear in alphabetical order. Unless otherwise stated the John Innes Composts are used. The Seed compost for seeds, and the No. 1 potting compost for all pottings.

Liquinure (Flower Special) is used for feeding the plants as and when necessary. Use according to the instructions on the bottle.

ACALYPHA (*Three-sided Mercury, Copper Leaf*)

Ornamental plants with orange-red, green and crimson leaves.

Propagation. Cuttings in February or March in a temperature of 80 deg. F.

Position. Well-drained pots.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in February or March. Water freely in spring and summer, moderately in autumn and winter.

Species cultivated.

A. godseffiana, 1 to 3 ft. high. The leaves are mostly green with cream edges. (*A. Hamiltoniensis* is probably a form of this species.)

A. hispida (*Syn. A. Sanderi* or *A. Sanderiana*), known as the Chenille Plant or Redhot Cat-tail, 6 to 10 ft. high with broad, green leaves.

Macafeana, **macrophylla**, **marginata**, **musarica** and **obovata** are all varieties of **A. Wilkesiana** (*Syn. A. illustris* and *A. tricolor*). This species is 3 to 4 ft. high with bronzy-green leaves, mottled with copper, red or purple.

AGAVE

(*American Aloe, Century-Plant, Mexican Soap-plant*)

Ornamental, evergreen plants. Flowers are borne on spikes 1 to 40 ft. high only when the plants are at least ten years old.

Propagation. Offsets at any time.

Position. Pots or tubs which may be stood outside from June to September.

Temperature. Winter, 50 deg. to 55 deg. F.

Summer, 55 deg. to 65 deg. F.

General management. Re-pot every five or six years. Water moderately from April to August, sparingly at other times.

Species cultivated.

A. americana and its variety *variegata* with dark green and yellow leaves.

ALOCASIA

Ornamental plants with short, thick stems and large arrow- or heart-shaped leaves, often variegated.

Propagation. Division of the rhizomes in March.

Position. Pots shaded from bright sunlight.

Temperature March to September, 70 deg. to 80 deg. F.

September to March 60 deg. to 65 deg. F.

General management. Re-pot in March. The base of the plant should always be raised above the rim of the pot. Water freely in summer, moderately afterwards.

Species cultivated.

A. argyrea has large leaves about 1½ ft. long, dark green in colour with a silvery sheen.

A. Lowii also has large leaves, olive-green in colour above

with paler-coloured veins, and dark purple beneath. The leaf-stems are pinky. The variety *Veitchii* is also grown. *A. Rodigasiana* has greyish-green leaves, purple beneath. *A. Watsoniana*, leaves large, green above and purplish beneath, margined with white. *A. zebrina*, long green arrow-shaped leaves with wavy margins. The leaf stalks are banded with green and white. *A. augustiana*, *A. chantrieriana*, *A. Marshallii*, *A. macrorrhiza*, *A. indica* variety *metallica*, *A. cuprea*, *A. mortefontanensis*, *A. sanderiana*, and *A. thibautiana* (*Syn. A. Korthalsii*) are among the other species sometimes grown.

ANANAS (*Pineapple*)

(Often listed in catalogues as *Ananassa*). The foliage is ornamental and evergreen.

Propagation. Suckers or crowns of fruit in spring in temperature of 80 deg. F.

Position. Pots in warm house fully exposed to sun.

Temperature. March to September, 75 deg. to 90 deg. F.

September to March, 60 deg. to 65 deg. F.

Feeding. Feed freely when the plants are established in their fruiting pots.

General management. Water moderately in winter, freely in summer. A moist atmosphere is essential in spring and summer. Withhold water when the fruit begins to ripen. Plants should fruit when two years old.

Species cultivated.

A. sativus, 3 ft. high. There are also varieties *variegatus*, with striped leaves; *porteanus*, in which the leaves have a central yellow band; *Smooth Cayenne* and *The Queen*.

ANTHERICUM.

An ornamental plant with curving green leaves, striped and margined with white.

Propagation.

(1) Division in March or April or October.

(2) Seeds sown in cold frame in September or March.

Position. Pots in partial shade.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 45 deg. to 50 deg. F.

General management. Re-pot in March or April. Water freely from March to September, moderately at other times. The leaves should be syringed on bright days.

Species cultivated.

A. elatum variegatum (Syn. *Chlorophytum elatum variegatum*). Leaves with creamy-white markings.

ARALIA (*Angelica Tree*)

Elegant ornamental plants with graceful growth and prettily divided leaves.

Propagation.

(1) Root cuttings in April in temperature of 80 deg. F.

(2) Cuttings of side shoots.

(3) Grafting in spring on stocks of *A. Guilfoylei* or *A. reticulata*.

Position. Pots shaded from strong sunlight.

Temperature. March to September, 70 deg. to 80 deg. F.

September to March, 60 deg. to 70 deg. F.

General management. Re-pot in March. Water freely from March to October, moderately afterwards. Syringe the plants once a day during summer.

Species cultivated.

A. elegantissima (Syn. *Dizygotheca elegantissima*), the False Aralia has thread-like dropping leaflets, the petioles being mottled with white.

A. Chabrierii (Syn. *Elaeodendron orientale*), the False Olive, has long, narrow leaves with a dark red mid-rib.

A. Veitchii (Syn. *Dizygotheca Veitchii*) has leaves reddish beneath. The variety *gracillima* has white mid-ribs.

ARAUCARIA (*Norfolk Island Pine*)

Small conifers suitable for greenhouse decoration.

Propagation.

(1) Cuttings of ends of young shoots in autumn.

- (2) Seeds sown from February to April in temperature of 65 deg. F.

Position. Well-drained pots or tubs in sunny house.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 45 deg. to 55 deg. F.

General management. Re-pot in March. Water freely during spring and summer, moderately at other seasons. The plants need plenty of room to develop and plenty of air in summer.

Species cultivated.

A. excelsa, green and its varieties *glauca* with bluish-green leaves, *compacta*, *elegans*, *gracilis* and *Silver Star*.

ASPARAGUS

Ornamental plants with fern-like foliage.

Propagation.

- (1) Division of roots in March.

- (2) Seeds sown in spring in temperature of 65 deg. F.

Position. Pots, tubs, beds or baskets.

Temperature. March to September, 55 deg. to 60 deg. F.

September to March, 50 deg. to 55 deg. F.

Feeding. Established plants may be fed weekly.

General management. Re-pot old plants in March. Pot on young plants whenever they require it. Water and syringe freely during the summer, moderately at other seasons.

Species cultivated.

A. Sprengeri with drooping shoots, 1 to 4 ft. long, covered with small leaves and sharp spines. Small white flowers are followed by bright red berries.

A. plumosus has fern-like shoots 4 to 10 ft. long and makes a good climber. The variety *nanus* makes a dwarf plant. There is also a variety *tenuissimus* with wiry stems.

A. falcatus may be used as a climber. The dark green leaves are narrow and sickle-shaped, the flowers are white and the berries brown.

A. myriocladus is a shrubby species with thread-like leaves.

A. virgatus (*Syn. A. elongatus*) is an erect plant with dark green, needle-shaped leaves, greenish-white flowers and orange-red berries.

ASPIDISTRA (*Parlour Palm*)

Evergreen plants with large, wide leaves and peculiar, insignificant flowers just above the soil surface.

Propagation. Division of roots from March to September.

Position. Pots, shaded from strong sunlight.

Temperature. 50 deg. F.

General management. The plants will thrive for years without re-potting but when necessary this should be done in March. Water freely in summer, moderately in winter. If a variegated plant produces a green leaf, this must be cut out immediately, otherwise it may grow at the expense of the variegated ones.

Species cultivated.

A. lurida, leaves green, 1 to 2 ft. long. The variety *variegata* has leaves striped with yellow.

BAMBUSA (*Bamboo*)

Graceful plants with grass-like foliage.

Propagation.

(1) Division from March to May.

(2) Cuttings of rhizomes in spring.

(3) Seeds sown in spring.

Position. Large pots or tubs.

Temperature. 40 deg. to 45 deg. F.

General management. Re-pot in March. Water freely in spring and summer, moderately at other times.

Species cultivated.

B. falcata variegata. (*Syn. Arundinaria falcata*). Stems are yellowish-green.

B. Fortunei aurea (*Syn. B. auricoma, Arundinaria auricoma* and *Bambusa viridi-striata*). Stems purplish-green, leaves striped green and yellow.

BERTOLONIA

Trailing plants with ornamental foliage.

Propagation. Cuttings in spring in temperature of 75 deg. F.

Position. Well-drained pans shaded from bright sunlight.

Temperature. March to September, 75 deg. to 85 deg. F.

September to March, 60 deg. to 65 deg. F.

General management. Re-pot February or March. Water freely in summer, sparingly in winter.

Species cultivated.

B. maculata with broad, hairy leaves, velvety-green above and the veins bordered with purple or magenta bands (*Sanderiana* or *Sanderac* are probably forms of this species).

B. marmorata, slightly hairy leaves, streaked with white along the veins.

B. pubescens, leaves covered with long white hairs and a chocolate-coloured band down the centre.

CALADIUM

Tuberous-rooted plants with ornamental, deciduous leaves, coloured green, white, crimson, red or rose.

Propagation. Division of the tubers in February or March.

Position. Well-drained pots shaded from bright sunlight.

Temperature. February to September, 70 deg. to 80 deg. F.

September to November, 65 deg. to 75 deg. F.

November to February, 55 deg. to 65 deg. F.

General management. Pot up the tubers moderately firmly in February or March in pots just large enough to take them. Pot on in April or May. Water freely in summer, moderately in spring and autumn and keep quite dry in winter.

Species cultivated.

C. argyrites (*Syn. C. Humboldtii*), dwarf, compact species with pale green leaves spotted with white.

C. bicolor (*var. pictum*), has apple-green leaves with large, irregular creamy-white blotches.

In addition to these species many beautiful varieties are cultivated.

CAREX (*Blue-Grass, Sedge*)

A perennial with ornamental grass-like foliage.

Propagation.

(1) Division of roots in March.

(2) Seeds sown in March.

Position. Well-drained pots.

Temperature. 45 deg. to 50 deg. F.

General management. Re-pot in March. Plenty of water is needed during the growing season, less at other times.

Species cultivated.

C. japonica (*Syn. C. Morrowii* and *C. tristachya*), leaves flat and evergreen, often striped with white.

CEROPEGIA

Trailing plants with ornamental leaves.

Propagation. Cuttings in spring in a temperature of 65 deg. F.

Position. Baskets or pots in the sun.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 45 deg. to 50 deg. F.

General management. Re-pot in March. Water moderately in summer, sparingly in winter.

Species cultivated.

C. Woodii, stems 2 to 3 ft. long with heart-shaped leaves. Small light-purple or pink flowers are produced in summer.

CODIAEUM (*Croton or South Sea Laurel*)

Shrubby, evergreen plants, the leaves beautifully marked with various colours.

Propagation.

(1) Cuttings of shoots at any time in a temperature of 75 deg. F.

(2) Stem-rooting in March or April.

Position. Pots near the glass.

Temperature. March to October, 70 deg. to 85 deg. F.
October to March, 55 deg. to 65 deg. F.

General management. Re-pot in March. Water freely

in summer, moderately at other times.

Species cultivated.

C. angustifolium, yellow and green, narrow leaves.

C. Laingii, red, green and salmon-pink leaves.

Andreanum (broad yellow leaves), *bruxellense* (broad leaves), *Chelsonii* (yellow and red mottled leaves), *Davisii* (narrow leaves marked with white), *edmontense* (narrow, bright coloured leaves), *inimitabile* (yellow leaves veined with red), *Puccianum* (broad leaves), *Reidii* (yellow leaves marked with red), *ruberrimum* (crimson leaves marked with creamy-white), are all forms of **C. variegatum var. pictum**.

COLEUS (*Flame Nettle*, *Nettle Geranium*)

Very ornamental plants with bright and variously-coloured nettle-shaped leaves.

Propagation.

(1) Cuttings of young shoots whenever available.

(2) Grafting in spring.

(3) Seeds sown in February in temperature of 75 deg. F.

Position. Pots in full sun.

Temperature. March to June, 75 deg. to 85 deg. F.

June to September, 65 deg. to 75 deg. F.

September to March, 45 deg. to 55 deg. F.

Feeding. Feed the plants two or three times a week after the final potting.

General management. Pot fairly firmly in February or March. Young plants must be potted on as they require it and pinched back once to make them bushy and of a good shape. Water freely during the summer, moderately at other times.

Species cultivated.

C. Blumei, leaves yellow, dull red or purple. Flowers dark blue or white. The variety *Verschaffeltii* is more branched and brilliantly coloured. There are many more ornamental-leaved varieties.

C. thyrsoides has ordinary green leaves and bright blue flowers from December to April.

N.B.—Very susceptible to Mealy Bug.

COLOCASIA (*West Indian Kale, Taro Root*)

Tuberous-rooted plants 2 to 4 ft. high, with ornamental leaves.

Propagation. Division of the roots in February or March.

Position. Well-drained pots shaded from the sun.

Temperature. February to September, 70 deg. to 80 deg. F.

September to November, 65 deg. to 75 deg. F.

November to February, 45 deg. to 55 deg. F.

General management. In February or March pot up the tubers moderately firmly in pots just large enough to hold them. Pot on in April or May. Water freely in summer, moderately in spring and autumn, but keep quite dry in winter.

Species cultivated.

C. antiquorum with large, heart-shaped leaves.

C. esculenta, very similar to *C. antiquorum*, but the tubers are edible and are largely used for food in the Hawaiian and other Pacific islands.

CYPERUS (*Umbrella Plant*)

Ornamental plants with grass-like foliage and elegant flat flowering heads with greenish-brown flowers.

Propagation.

(1) Division of roots in March and April.

(2) Cuttings of heads of flowers, with small piece of stem attached.

(3) Seeds sown in March or April in temperature of 55 to 65 deg. F.

Position. Pots in shady part of house.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 45 deg. to 55 deg. F.

Feeding. When the pots are full of roots, feed once a week.

General management. Re-pot February and March. Water moderately in winter, freely at other times. Syringe once a day.

Species cultivated.

C. alternifolius grows 1 to 3 ft. tall, and has green leaves.

The variety *variegatus* has leaves striped with white.

C. natalensis which grows about 2 ft. high.

DARLINGTONIA (*Californian Pitcher-Plant*)

Herbaceous insectivorous plant with ornamental foliage. The pitchers are borne on the summit of the leaves, they are hood-like, bright green and mottled with white and pink.

Propagation. -

- (1) Division of side-shoots at any time.
- (2) Seeds sown in mixture of fibrous peat, charcoal, sphagnum and sand in April or May.

Compost. Equal parts peat, chopped sphagnum, sharp silver sand and small pieces of limestone.

Position. Pots in shade.

Temperature. 55 deg. to 60 deg. F. in summer.
45 deg. to 50 deg. F. in winter.

General management. Re-pot in February or March. Water freely at all times and syringe daily in spring and summer.

Species cultivated.

D. californica.

DIEFFENBACHIA (*Dumb Cane*)

Plants with broad green leaves, variegated with white or yellow.

Propagation. Cuttings of stems 1 to 2 ins. long in spring in temperature of 75 deg. to 85 deg. F.

Position. Well-drained pots in moist atmosphere, shaded during the summer.

Temperature. February to September, 65 to 85 deg. F.
September to February, 55 to 65 deg. F.

General management. Re-pot in February or March. Water freely in summer, moderately at other times. Syringe daily in summer.

Species cultivated.

D. Bausei, yellowish-green leaves blotched with dark green and spotted with white.

D. Rex, white and green leaves.

D. splendens, leaves spotted with white.

Barraquiniana and *Jenmannii* are both varieties of *D. picta*. The leaves of both are spotted and veined with white.

DRACAENA (*Dragon Plant, Dragon Tree*)

Ornamental foliage plants requiring a stove temperature. The leaves are marked with various colours.

Propagation.

- (1) Cuttings of main stems or side shoots, 1 in. long and partially buried horizontally in the compost in March in temperature of 85 deg. F.
- (2) Root cuttings in March or April in temperature of 75 to 80 deg. F.
- (3) Stem rooting in March or April.
- (4) Offsets at any time.
- (5) Seeds sown 1 in. deep in March in temperature of 85 deg. F.

Compost. Two parts peat, one part loam and sand.

Position. Well-drained pots in light part of house, but shaded from very bright sunlight.

Temperature. March to September, 75 deg. to 85 deg. F.
September to March, 65 deg. to 75 deg. F.

General management. Pot February and March. Water moderately in winter and freely in summer, and syringe the leaves during hot weather.

Species cultivated.

D. deremensis, leaves are long and pointed.

D. fragrans Lindenii, leaves yellow and green.

D. fragrans massangeana, leaves white and green.

D. godseffiana (*Syn. Pleomele godseffiana*), leaves white and green.

D. goldieana (*Syn. Pleomele goldieana*), leaves green and white.

D. marginata (*Syn. Cordyline marginata*), leaves grey-green, purple margins.

D. sanderiana (*Syn. Pleomele sanderiana*), leaves white and green.

D. indivisa (*Syn. Cordyline indivisa*), broad, dark green drooping leaves.

D. terminalis (*Syn. Cordyline terminalis*), with broad green leaves, has produced many forms.

EULALIA (*Zebra-Striped Rush*)

Ornamental grasses with light, elegant growth and narrow leaves.

Propagation. Division of plants in March or April.

Position. Pots shaded from bright sunlight.

Temperature. 40 deg. to 50 deg. F.

General management. Re-pot March or April. Water freely in summer, but in winter give only enough to keep the soil just moist.

Species cultivated.

E. japonica (*Syn. Miscanthus sinensis*), green leaves, with white mid-rib. The varieties *gracillima* (dwarf and narrow-leaved), *variegata* (leaves striped with yellow or white) and *zebrina* (leaves cross-banded with yellow) are also grown.

FERNS

Foliage plants usually with graceful deeply-cut leaves, green in colour or sometimes tinted with rather metallic shades. All need the same general treatment, though some will grow in the ordinary greenhouse, while others need a stove temperature.

Propagation.

(1) Division of the plants in February or March.

(2) Bulbils in the case of those species which form them.

(3) Spores as soon as they are ripe in a temperature of 55 to 75 deg. F.

Position. Pots or baskets, shaded from strong sunlight, or in borders beneath the staging.

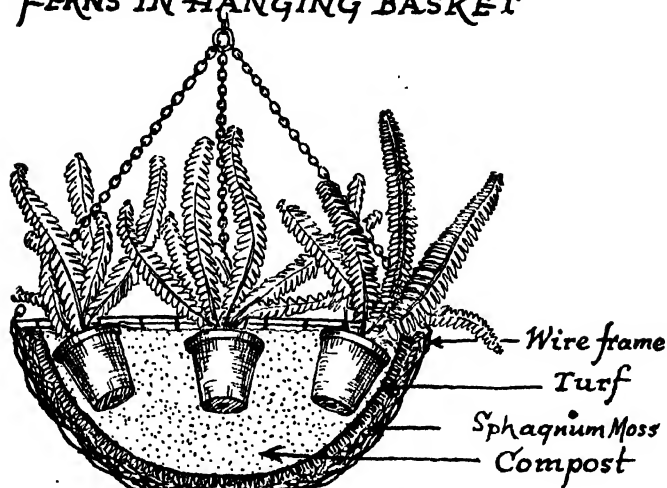
Temperature. *Stove species*: March to September, 65 deg. to 75 deg. F.; September to March, 55 deg. to 60 deg. F.

Greenhouse species: March to September, 50 deg. to 60 deg. F.; September to March, 40 deg. to 50 deg. F.

Feeding. Strong manures should never be given. Apply a weak solution occasionally to pot-bound plants.

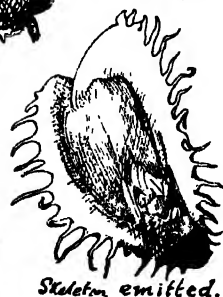
General management. Re-pot moderately firmly in spring, when old fronds should be removed. Water freely in

FERNS IN HANGING BASKET



DIONEA MUSCIPULA

(Venus's Fly Trap)



summer, moderately at other times, but soil must never be allowed to become too dry. Syringe the foliage in hot weather, and syringe between the pots in spring and summer.

Species cultivated.

Many kinds may be grown, but only the commonest will be mentioned here.

Stove species :

Adiantum (Maidenhair Fern), e.g., *gracillimum*, *concinnum*, *farleyense* and *rubellum*.

Blechnum braziliense (Brazilian Tree Fern).

Davallia, e.g., *elegans* and *fijiensis*.

Gymnogramme, e.g., *calomelanos chrysophylla* (Gold Fern) and *sulphurea*.

Nephrolepis, e.g., *Duffii* and *philippinensis*.

Platyserium, e.g., *aethiopicum*, *grande* and *Willinckii*.

Greenhouse species :

Adiantum, e.g., *capillus-veneris*, *cuneatum* and *formosum*.

Asplenium bulbiferum.

Davallia, e.g., *bullata* (Squirrel's Foot Fern) and *Mariesii*.

Lastrea Sieboldii (Syn. *Nephrodium Sieboldii*).

Nephrodium molle.

Nephrolepis, e.g., *cordifolia compacta* and *exaltata* (Ladder Fern).

Polypodium aureum (Syn. *Phlebodium aureum*).

Pteris, e.g., *cretica major* and *serrulata* (Spider Fern).

FITTONIA

Evergreen trailing plants with ornamental foliage.

Propagation.

(1) Division of plants in February or March.

(2) Cuttings of firm shoots from February to April in temperature of 75 to 85 deg. F.

Position. Shallow pans, pots or beds in the shade.

Temperature. March to October, 65 deg. to 75 deg. F.

October to March, 55 deg. to 60 deg. F.

General management. Pot or plant in spring Water moderately in winter, freely at other times.

Species cultivated.

F. argyroneura, leaves green, veined with white.

F. gigantea, leaves green, veined with red.

F. Verschaffeltii, *var. Pearcei*, leaves green, veined with red and glaucous below.

GYNURA

Perennial plants with purple-tinted ornamental foliage.

Propagation. Cuttings in spring.

Position. Pots in partial shade.

Temperature. March to October, 70 deg. to 80 deg. F.

October to March, 55 deg. to 65 deg. F.

General management. Re-pot in March. Water freely in summer, moderately afterwards.

Species cultivated.

G. aurantiaca, 2 ft. tall.

HELICONIA (*False Plantain*)

Plants with ornamental foliage, the stems are striped with black, green and yellow.

Propagation. Division of roots in February or March.

Position. Pots in shade.

Temperature. February to September, 65 deg. to 75 deg. F. September to November, 60 deg. to 70 deg. F. November to February, 55 deg. to 65 deg. F.

General management. Re-pot February or March. Water freely in spring and summer, moderately in autumn, but keep dry in winter. Syringe daily in spring and summer.

Species cultivated.

H. aureo-striata, green and yellow leaves.

H. illustris *var. rubricaulis*, green and red leaves and red stems.

ISOLEPIS (*Club Rush*)

Plant with grass-like drooping foliage, 6 to 12 ins. long.

Propagation.

(1) Division of plants in March.

(2) Seeds sown in spring in temperature of 60 deg. to 65 deg. F.

Position. Small pots, baskets or along the edge of the staging.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 45 deg. to 55 deg. F.

General management. Re-pot February or March. Water freely in spring and summer, moderately at other times.

Species cultivated.

I. gracilis (Syn. *Scirpus cernuus*).

LEEA

Ornamental shrubby plants with feather-shaped leaves, bronzy-green striped with white above and dark red below.

Propagation.

Cuttings of side-shoots in spring in a temperature of 75 deg. to 85 deg. F.

Position. Well-drained pots in shade.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 55 deg. to 65 deg. F.

General management. Re-pot in February or March. Water freely in summer, moderately at other times. Syringe daily during the summer.

Species cultivated.

L. amabilis splendens, about 3 ft. high.

LEUCOPHYTA

Trailing shrubby plant with white cottony stems.

Propagation. Cuttings in August in a cold frame.

Position. Pots in the sun.

Temperature. 40 deg. to 45 deg. F.

General management. Re-pot in April. Water freely in summer, moderately at other times.

Species cultivated.

L. Brownii (Syn. *Calocephalus Brownii*).

MARANTA (*Arrowroot Plant*)

Ornamental plants, the leaves are lance, heart, or egg-shaped, round or oblong, and marked with various colours.

Propagation. Division of the plants in February or March.

Position. Well-drained pots in the shade.

Temperature. February to October, 65 deg. to 75 deg. F.
October to February, 55 deg. to 65 deg. F.

Feeding. Feed plants occasionally during the summer.

General management. Re-pot each year in February or March. Water copiously in spring and summer, moderately in autumn and keep almost dry in winter. Syringe daily in summer.

Species cultivated.

M. bicolor, 1 ft. high, leaves olive-green.

M. Closonii, leaves dark green, variegated with pale yellow.

M. eximia (*Syn. Calathea eximia*), leaves striped with olive-green and silver above, and with wine-red below.

M. illustris (*Syn. Calathea illustris*), leaves bright pea-green, streaked with deeper green and blotched with white.

M. insignis (*Syn. Calathea insignis*), leaves green with olive-green margins and blotches, under surface purple. Besides the above, many other forms may be obtained.

MICONIA

Ornamental evergreen plants, leaves velvety, bronzy-green above, reddish-purple below.

Propagation.

(1) Cuttings in spring in temperature of 80 to 90 deg. F.

(2) Seeds sown in March or April in temperature of 85 deg. F.

Position. Pots in shade, atmosphere moist.

Temperature. March to September, 75 deg. to 85 deg. F.
September to March, 60 deg. to 70 deg. F.

General management. Re-pot in February or March. Water moderately in winter, freely at other times. Syringe the plants in spring and summer.

Species cultivated.

M. magnifica (*Syn. Cyanophyllum magnificum*).

MUSA

Perennials with ornamental large green leaves and edible fruits. The flowers are yellow, scarlet and green and are out from January to April.

Propagation. Suckers at any time in a temperature of 75 to 85 deg. F.

Position. Pots, tubs or beds.

Temperature. March to October, 70 deg. to 80 deg. F.

October to March, 60 deg. to 70 deg. F.

Feeding. Feed two or three times a week from March to October.

General management. Pot or plant from January to April. Water copiously from February to October, but sparingly in the winter. Syringe once a day in winter, twice a day in summer. A moist atmosphere is essential.

Species cultivated.

M. Cavendishii, 5 to 10 ft.

M. Ensete.

M. paradisiaca var. sapientum (Banana), the variety *rubra* has red fruits.

MYRSIPHYLLUM (*Smilax*)

Climbing plant with slender green shoots bearing oval leaves, small greenish-white flowers and dark purple berries.

Propagation.

(1) Cuttings of young shoots in spring or summer.

(2) Seeds sown in February in a temperature of 65 deg. F.

Position. Pots, tubs, baskets or beds.

Temperature. March to September, 65 deg. to 60 deg. F.

September to March, 50 deg. to 55 deg. F.

Feeding. Established plants should be fed occasionally.

General management. Pot or plant in March. Water and syringe freely during the summer, moderately at other times.

Species cultivated.

M. asparagoides (Syn. *Asparagus medeoloides*, *A. asparagoides* and *Medeola asparagoides*).

NEPENTHES (*Pitcher Plant*)

Ornamental shrubby plant. The leaves are oblong or lance-shaped, ending in a pitcher-like appendage, coloured green and mottled with red, brown and crimson.

Propagation.

- (1) Cuttings of one-year-old shoots with bottom heat of 85 deg. F. at any time. Cuttings 6 ins. in inverted flower pots, no soil but in very moist propagation frame. Keep closed.
- (2) Seeds sown on the surface of a mixture of fibrous peat and sphagnum moss in a temperature of 80 to 85 deg. F.

Compost. Two parts fibrous peat, one part sphagnum moss.

Position. Baskets in shade.

Temperature. March to September, 70 deg. to 85 deg. F.
September to March, 65 deg. to 75 deg. F.

General management. Plant in February or March. Water copiously in summer, moderately at other times. Syringe twice a day. A moist atmosphere is essential.

Species cultivated.

N. ampullaria, green pitchers with a small lid.

N. bicalcarata, green bag-shaped pitchers.

N. Curtisii superba, rich blood-red with longitudinal yellowish-green markings, the lid is yellow speckled with red.

N. hookeriana, pitchers are spotted with red.

N. phyllamphora, pitchers bright green.

N. rafflesiana, greenish-yellow pitchers richly marked with brown.

N. ventricosa, pitchers green marked with brown and crimson.

Besides these there are numerous hybrids, such as *amesiana* (green and red), *dicksoniana* (light green and reddish-crimson) and *Wittei* (green and dark red).

NIDULARIUM

Ornamental plants with leaves in rosettes, and green, red or crimson bracts.

Propagation. Offshoots from February to April in temperature of 85 deg. F.

Position. Well-drained pots in light part of the house.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in February or March. Water moderately in winter, freely at other times.

Species cultivated.

N. fulgens, leaves spotted with dark green, 9 to 12 ins. high.

N. Innocentii, leaves tinted with brown or red.

N. amazonicum (*Syn. Canistrum amazonicum*), leaves brownish.

N. princeps (*Syn. Aregelia princeps* and *Karatas Meyendorfi*).

N. spectabilis (*Syn. Aregelia spectabilis*).

Chantrieri is a good hybrid

PALMS

Decorative foliage plants, slow growing and useful when small for the ordinary sized house.

Propagation. Seeds sown any time in a temperature of 85 deg. F. It is advisable to buy in young plants as the seeds require a high temperature for germination.

Position. Pots or tubs in partial shade.

Temperature. Summer, 60 deg. to 65 deg. F.

Winter, 45 deg. to 55 deg. F.

Feeding. Feed established plants once a week during the summer, and twice a week if roots are very restricted.

General management. Re-pot in early spring. There is no need to re-pot every year, the plants may remain in the same pots for several years providing they are top dressed each spring with a little fresh soil. Give plenty of water in summer and keep the roots just moist in winter, sponge or syringe the foliage occasionally to remove dust, etc.

Species cultivated.

Cocos, e.g. *flexuosa* (*Syn. Arecastrum Romanzoffianum*)

var. australe), *Weddelliana* (Syn. *Syagrus Weddelliana*), *insignis* (Syn. *Syagrus insignis*) and *plumosa* (Syn. *Arecastrum Romanzoffianum*).

Cycas revoluta, the Sago palm.

Kentia, e.g. *Belmoreana* (Syn. *Howea Belmoreana*), *Forsteriana* (Syn. *Howea Forsteriana*). *Livistona rotundifolia* (Syn. *L. altissima* and *Corypha rotundifolia*).

Phoenix, e.g. *canariensis* (Syn. *P. Jubae* and *P. tenuis*), *Roebelenii* and *rupicola*.

Areca lutescens (Syn. *Chrysalidocarpus lutescens*).

Chamaerops, e.g. *excelsa* (Syn. *C. Fortunei*, *Trachycarpus excelsa* and *T. Fortunei*), and *humilis*.

PANDANUS (*Screw Pine*)

Evergreen shrubby plants with ornamental foliage, leave narrow and strap-shaped.

Propagation. Suckers from February to April.

Position. Pots in sun.

Temperature. March to September, 65 deg. to 85 deg. F.

September to March, 55 deg. to 65 deg. F.

General management. Re-pot from January to April. Water moderately in winter, freely at other times. Syringe twice a day in spring and summer. A moist atmosphere is essential.

Species cultivated.

P. Baptistii, 4 to 6 ft. high, leaves yellow and green.

P. javanicus variegatus (Syn. *P. candelabrum variegatus*), 2-3 ft., leaves green and white.

P. Sanderi, 3 ft., leaves green and yellow.

P. Veitchii, 3 ft., leaves green and white.

PANICUM (*Panick Grass*)

A pretty trailing grass, the green leaves being striped with white and often with pink.

Propagation. Cuttings of young shoots in small pots three or four round one pot in a propagating frame in a temperature 65 deg. to 75 deg. F. any time.

Position. Small pots or baskets in sun or shade.

Temperature. March to September, 60 deg. to 75 deg. F.
September to March, 55 deg. to 65 deg. F.

General management. Re-pot in March. Usually the cuttings are not potted up separately, but the three or four are potted on together. Water freely in summer, moderately in winter.

Species cultivated.

P. variegatum (Syn. *Oplismenus compositus* var. *vittatus* and *O. Burmannii variegatus*).

PELLIONIA

Ornamental creeping plants, with roundish, oval or heart-shaped leaves, olive-green in colour with violet and white markings.

Propagation.

- (1) Division of plants in March or April.
- (2) Cuttings of shoots in spring in a temperature of 75 deg. to 85 deg. F.

Position. Shallow pans or beds beneath the staging.

Temperature. April to September, 65 deg. to 75 deg. F.
September to April, 55 deg. to 65 deg. F.

General management. Pot or plant in March or April. Water moderately in winter, freely at other times.

Species cultivated.

P. Daveauana, leaves bronzy olive-green.

P. pulchra, stems purplish, leaves oblong, light green in colour with black veins, pale purple beneath.

PEPEROMIA (*Pepper Elder*)

Creeping perennial with ornamental foliage.

Propagation. Cuttings of shoots, or a single joint, with a leaf attached, in spring with bottom heat, and a temperature of 65 deg. to 75 deg. F.

Position. Shallow pans or beds, shaded from the sun.

Temperature. April to September, 60 deg. to 75 deg. F.
September to April, 55 deg. to 65 deg. F.

General management. Pot or plant in March or April. Water moderately in winter, freely in summer. Syringe once a day in summer.

Species cultivated.

P. Sandersii var. *argyreia*, leaves green and white, with light-coloured patches between the veins.

PHILODENDRON

Ornamental evergreen dwarf or climbing plants, leaves oblong, heart-, egg-, or arrow-shaped.

Propagation. Cuttings of stems in temperature of 75 deg. F. at any time.

Position. Dwarf kinds in pots, tall kinds in beds or borders.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Pot or plant from January to April. Water freely and syringe daily.

Species cultivated.

P. andreanum, a climber.

P. gloriosum, leaves green, white and pink, a climber.

P. verrucosum (*Syn. P. Lindenii*), dwarf.

PHYLLANTHUS

Ornamental plants. The leaves are small and oval, variegated with purple, white and yellow.

Propagation. Cuttings of firm shoots, 2 to 3 ins. long in spring or summer in a temperature of 75 deg. F.

Position. Well-drained pots in shade.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in February or March. Water freely in summer, moderately in winter, syringe twice a day in summer. Cut back into shape in January.

Species cultivated.

P. angustifolius (*Syn. Xylophylla angustifolia*).

P. Emblica (*Syn. P. mimosaeifolius*). mimosa-like leaves.

P. nivosus (*Syn. Breynia nivosa*), 6 to 10 ft., leaves green and white.

P. pulcher (*Syn. Reidia glaucescens*), 3 to 4 ft., leaves green.

PHYLLOTAENIUM

Tuberous ornamental plants with leaves shaped like arrow-heads.

Propagation. Division of roots in February or March.

Position. Well-drained pots in shade.

Temperature. February to September, 70 deg. to 80 deg. F.; September to November, 65 deg. to 75 deg. F.; November to February, 55 deg. to 65 deg. F.

General management. Pot up the tubers moderately firmly in pots just large enough to take them in February or March. Pot on in April or May. Water freely in summer, moderately in spring and autumn and keep dry during the winter.

Species cultivated.

P. Lindenii (*Syn. Xanthosoma Lindenii*), leaves bright green with white veins.

PILEA (*Artillery or Pistol Plant, Stingless Nettle*)

Dwarf foliage plants with small green leaves, and insignificant flowers.

Propagation.

(1) Division of plants in February or March.

(2) Cuttings inserted singly in well-drained pots in temperature of 65 deg. to 75 deg. F., from January to May.

(3) Seeds sown in spring in temperature of 65 deg. to 75 deg. F.

Position. Small pots shaded from bright sunshine, or makes excellent baskets.

Temperature. March to September, 70 deg. to 80 deg. F. September to March, 45 deg. to 55 deg. F.

General management. Re-pot February to April. Water freely in summer, moderately afterwards.

Species cultivated.

P. muscosa (sometimes known as *P. microphylla*).

SANSEVIERA (*Bowstring Hemp, Angola Hemp*)

Plants with ornamental foliage. The flowers are insignificant, being white, green or yellowish.

Propagation. Division of plants from February to April.

Position. Pots in shade.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 55 deg. to 65 deg. F.

General management. Re-pot February to April. Water copiously in summer, moderately at other times. Syringe in summer.

Species cultivated.

S. cylindrica, 2½ to 5 ft., leaves banded with dark green.

S. thyrsiflora (*Syn. S. guineensis*), 1 to 1½ ft. leaves banded with pale green.

S. trifasciata (*Syn. S. Laurentii*), 2 ft., leaves banded with golden-yellow.

SAXIFRAGA (*Aaron's Beard, Mother of Thousands*)

The shoots are long, slender and trailing, with tiny plantlets arising here and there all over the plant.

Propagation.

(1) Division in spring.

(2) Plantlets potted up singly in spring and summer.

Position. Small, well-drained pots or baskets in full sunlight.

Temperature. March to October, 65 deg. to 70 deg. F.

October to March, 45 deg. to 55 deg. F.

General management. Re-pot in March or April. Careful watering is essential, and during the winter the soil should only be kept just moist.

Species cultivated.

S. sarmentosa has green leaves, the variety *tricolor* is more compact, the leaves being beautifully blotched with creamy-white and crimson.

SCHISMATOGLOTTIS

Dwarf ornamental plants, the leaves are oblong or heart-shaped, green and striped with silver grey.

Propagation. Division of plants in February or March.

Position. Well-drained pots in shade.

Temperature. March to September, 75 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

Feeding. Feed occasionally during the summer.

General management. Re-pot in February or March. Water copiously in summer, moderately afterwards. Syringe once a day during the summer.

Species cultivated.

S. concinna (Syn. *S. Lavellei*).

SELAGINELLA (*Creeping Moss, Tree Club Moss*)

Green mossy or fern-like, while others are dwarf, bushy or trailing.

Propagation.

(1) Division.

(2) Cuttings of shoots 3 ins. long, any time except in winter in a temperature of 80 deg. F.

Position. Pots or pans shaded from strong sunlight.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 40 deg. to 50 deg. F.

General management. Re-pot February or March. Several cuttings should be grown together in one pot. The roots must be kept moist all the year, but plants must be watered freely in summer and syringed daily.

Species cultivated.

S. amoena (Syn. *S. caulescens*) grows about 12 ins. high, with green leaves.

S. Martensii is fairly common, 5 to 12 ins. high.

S. apoda has creeping stems about 4 ins. long covered with small, pale green leaves.

S. Braunii is an erect species, about 18 ins. high with small, brownish-green leaves.

S. Kraussiana is a moss-like trailer with bright green

leaves. There is a variety *variegata*. Several other species and varieties are also grown.

ZEBRINA (*formerly called Tradescantia*)

Plants with ornamental leaves.

Propagation. Cuttings in summer in temperature of 75 deg. F.

Position. Well-drained pots.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Re-pot in March or April. Water freely in spring and summer, moderately at other times.

Species cultivated.

Z. discolor (*Syn. Rhoeo discolor*), creeping habit, leaves dark green above, purple below.

T. zebrina (*Syn. Zebrina pendula*), leaves purple beneath and striped with white above.

CHAPTER XIV

SHRUBS AND CLIMBERS

I cannot understand

1. With verberna—what is sweet-scented?
2. How to water the bottle-brush tree.
3. How to re-pot the tea plant.
4. About orange growing.
5. Who Daphne is.
6. How to prune eucalyptus.

It is difficult, in some cases, to decide whether a plant is a shrub or an herbaceous flowering plant. The species mentioned in this chapter under shrubs are all plants with woody stems. Among the climbers, however, some are herbaceous and some are woody, and they are natural climbers, or trailing plants suitable for training up against a wall, rafter, etc.

All the species and varieties mentioned may be bought at a reasonable price, and they are not difficult to cultivate so long as they are given the conditions they require. The majority are included on account of their flowers, but some have, in addition, ornamental leaves or coloured attractive fruits.

(Composts and feeding as at the beginning of the chapter on foliage plants.)

ABELIA

Evergreen flowering shrub.

Time of flowering. Summer.

Propagation.

- (1) Cuttings of firm shoots in a cold frame in July.
- (2) Layers in March.

Position. Well-drained pots in the sun ; outside during the summer ; in cold frame from October to January.

Temperature. 40 deg. to 45 deg. F.

General management. Re-pot in October. Water freely when in full growth, moderately at other times, very little during the winter.

Pruning. Cut back straggly shoots after flowering.

Species cultivated.

A. uniflora, 6 ft. high, with pinkish-white flowers.

ABUTILON

Shrubs and semi-climbers, useful for their fine foliage as well as their beautifully veined bell-shaped flowers.

Time of flowering. Spring and early summer.

Propagation.

(1) Cuttings of side-shoots in spring or summer in a temperature of 65 deg. F.

(2) Seeds sown in March in a temperature of 70 deg. F.

Position. Pots in the sun, or planted out in borders.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 50 deg. to 55 deg. F.

Feeding. Feed once a week when the pots are full of roots and the plants growing actively.

General management. Re-pot in March, or top-dress plants in borders. Water freely in spring and summer, moderately in autumn and winter.

Pruning. In February thin shoots and trim into shape.

Species cultivated.

Plants grown for their flowers include :

A. Darwini, orange ; and popular varieties such as *Boule de Neige*, white ; *Fire Fly*, crimson ; *Golden Fleece*, a clear yellow, and *Jubilee*, pink.

Varieties with handsome foliage include :

Savitzii and **Souvenir de Bonn** with silver variegations and **A. Thompsonii**, with leaves mottled yellow and green.

A. vexillarium (*Syn. A. megapotamicum*), and **A. insigne** are suitable for growing up the rafters

ACACIA (*Wattle*)

Trees and shrubs with yellow flowers and decorative pinnate leaves.

Time of flowering. Spring and early summer.

Propagation.

(1) Heel cuttings of half-ripened shoots in June or July in a cold frame or inside under a bell-jar.

(2) Seeds sown in March in a temperature of 60 deg. F.

Position. Pots or borders. Pots may be plunged outside after flowering until October.

Temperature. March to September, 55 deg. to 60 deg. F.

September to March, 40 deg. to 45 deg. F.

General management. Re-pot firmly in summer, every three or four years. Water freely in spring and summer, moderately in winter.

Pruning. Immediately after flowering. Thin shoots and cut back straggling growths into shape.

Species cultivated.

A. armata, the *Kangaroo thorn*, *A. Drummondii* and *A. leprosa* all grow 6 to 10 ft. high, while *A. cordata* is a dwarf species, only reaching 12 to 18 ins. high, and *A. pulchella* is 3 to 6 ft. high.

Taller growing species include *A. baileyana*, *A. dealbata*, the *Silver Wattle* of the Australian settlers, and *A. riceana* with a graceful weeping habit.

ALOYSIA (*Sweet-scented Verbena*)

A deciduous shrub with sweetly-scented foliage and small lilac-pink flowers.

Time of flowering. August.

Propagation. Heel cuttings of young shoots about 4 ins. long in March, in a temperature of 65 deg. F.

Position. Pots or borders.

Temperature. In winter, 45 deg. to 50 deg. F., at other times, 50 deg. to 55 deg. F.

General management. Re-pot in spring when necessary. Water freely in summer, but little should be given in winter. May be grown as a bush or trained up a pillar.

Pruning. February. All the previous year's growths should be cut back to two or three buds.

Species cultivated.

A. citriodora (*Syn. Lippia citriodora*), 10 or 15 ft. high.

AOTUS

Dwarf evergreen flowering shrub, about 3 ft. high, with slender shoots and graceful spikes of yellow and crimson flowers.

Time of flowering. May.

Propagation. Cuttings of half-ripened shoots in spring, in temperature of 55 deg. F.

Position. Well-drained pots in the sun.

Temperature. March to September, 55 deg. to 60 deg. F.
September to March, 45 deg. to 50 deg. F.

General management. Re-pot every two or three years in June or July. Plenty of water is necessary in summer and plants should be syringed daily. In winter the soil should be kept just moist. Ventilate freely during the summer.

Pruning. After flowering cut back shoots to keep the bushes shapely.

Species cultivated.

A. gracillima.

APHELANDRA

Evergreen flowering shrubs; the flowers are surrounded by beautifully-coloured bracts.

Time of flowering. Autumn and winter.

Propagation. Cuttings of firm shoots in March or April in bottom heat.

Position. Pots in a warm house.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in March. Water freely in summer, moderately in winter, but atmosphere should always be moist.

Pruning. Cut back shoots to within 1 in. of their base in February.

Species cultivated.

A. aurantiaca Roezlii, 3 ft. high with scarlet flowers and twisted leaves.

A. blanchetiana, golden-yellow flowers in August.

A. chamissoniana, yellow flowers in November.

A. fascinator, 18. ins. high with scarlet flowers in September.

A. libanoniana, deep yellow and red flowers.

A. nitens, 2 to 3 ft. high with vermilion-scarlet flowers.

A. squarrosa, yellow and orange flowers.

A. tetragona, 3 ft. high with orange-scarlet flowers from August to November.

ARDISIA (*Spear Flower*)

Evergreen shrubby plant 3 to 4 ft. high, with white flowers followed by red berries.

Time of flowering. June.

Propagation.

(1) Cuttings of side-shoots in March in a temperature of 75 deg. F.

(2) Seeds sown in spring in a similar temperature.

Position. Pots in the sun.

Temperature. March to September, 70 deg. to 80 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Re-pot in February or March.

Water freely in summer, but give only a little in winter.

Pruning. Cut back straggly shoots closely in March.

Species cultivated.

A. crenata (Syn. *A. crenulata* and *A. crispa*).

AZALEA

Three types are commonly grown in pots under glass, hybrids and varieties of the so-called Indian Azaleas, with single or double flowers in all shades of red, pink and white; varieties of the Japanese *Azalea mollis*, a deciduous species, and obtainable in various shades of rose, orange, yellow and flame; and dwarf evergreen species.

Time of flowering. December to May.

Propagation.

- (1) Heel cuttings of half-ripened shoots in spring in a temperature of 65 deg. to 75 deg. F., for Indian Azaleas.
- (2) Cuttings of half-ripened shoots in August in cold frame for *A. mollis*.
- (3) Grafting in spring for Indian Azaleas, and *A. mollis*.
- (4) Layering in spring after flowering for *A. mollis*.
- (5) Seeds sown when ripe in a temperature of 55 deg. to 65 deg. F. for *A. mollis* and Indian Azaleas.

Compost. Lime must be omitted from the soil, add plenty of peat.

Position. Well-drained pots in the sun, October to June ; in partial shade outside for the rest of the year.

Temperature. October to November, 40 deg. to 45 deg. F.
November to June, 60 deg. to 65 deg. F.

Feeding. Feed once a week when the flower buds form.

General management. Re-pot firmly after flowering every two years. Water moderately October to March, freely at other times, but roots must never be allowed to become dry. Syringe once a day after flowering until the plants are put outside.

Pruning. Shorten back straggly growths after flowering and remove all seed pods.

Species cultivated.

There are many varieties of the Indian Azalea from which to choose, e.g. :

Apollo, a double scarlet.

Daybreak, a soft pink.

Niobe, double ivory-white with a yellow tube.

Theo. Findersen, brick-red.

A. mollis varieties include :

Alphonse Lavallee, orange.

Baron Edmund de Rothschild, red.

Comte de Gomer, deep pink.

Comte de Quincey, yellow.

The dwarf evergreen types include:

A. amoena, rosy-purple.

A. rosaeflora (*Syn. A. balsaminaeflora*), double salmon-red.

A. Hinodegiri, brilliant red.

BAUHINIA

Evergreen flowering shrubs.

Time of flowering. Summer.

Propagation. Cuttings in July in a temperature of 75 deg. F.

Position. Pots in the sun.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot firmly in March. Water freely in spring and summer, moderately at other times.

Species cultivated.

B. purpurea, red and white flowers.

BORONIA (*Australian Native Rose*)

Dwarf evergreen shrubs with attractive fragrant flowers.

Time of flowering. April to June.

Propagation. Cuttings of firm young shoots, 2 or 3 ins. long, from June to August, under a shaded bell-glass in a temperature of 50 deg. F.

Position. Put pots outside in partial shade from June till August; in house for rest of year.

Temperature. March to September, 50 deg. to 60 deg. F.
September to March, 45 deg. to 50 deg. F.

General management. Young plants must be stopped two or three times to promote bushy growth. Re-pot firmly when necessary directly after flowering. Water freely in summer, moderately at other times.

Pruning. Cut back shoots into shape after flowering.

Species cultivated.

B. elatior, 3 or 4 ft. tall with pendulous rosy-carmine flowers.

B. heterophylla, 2 to 3 ft. tall with rose-coloured flowers.

B. megastigma, 18 ins. tall with yellow and maroon flowers.

BOUVARDIA

Dwarf evergreen shrubs with fragrant flowers.

Time of flowering. September to March.

Propagation.

(1) Division in March.

(2) Cuttings of young shoots 2 or 3 ins. long in March in temperature of 65 deg. F.

(3) Root cuttings 1 in. long in spring.

Position. In cold frame from June to September, otherwise in warm house.

Temperature. February to September, 55 deg. to 75 deg. F.

September to February, 45 deg. to 55 deg. F.

Feeding. Feed once a week from September to June.

General management. Re-pot at the end of March. Water moderately in spring, freely in summer, and only just keep moist in winter. Syringe the foliage once or twice a day in summer, and pinch back the shoots occasionally until the end of August.

Pruning. Towards the end of February shorten back the previous year's growths to within 1 in. of their base.

Species cultivated.

Varieties and hybrids are commonly cultivated.

BRUNFELSIA

Evergreen flowering shrubs.

Time of flowering. Winter, spring or summer.

Propagation. Cuttings 2 to 3 ins. long from February to August in a temperature of 60 deg. to 70 deg. F.

Position. Well-drained pots in a warm house.

Temperature. March to October, 60 deg. to 70 deg. F.

October to March, 45 deg. to 55 deg. F.

Feeding. Feed once a week in summer.

General management. Re-pot firmly immediately after

flowering. Water moderately in winter, freely at other times. Syringe in spring and summer.

Pruning. Thin lightly after flowering. Pinch back young shoots when they are about 6 ins. long.

Species cultivated.

B. americana (*Syn. Franciscea americana*), Lady of the Night, 4 to 8 ft. high with pale yellow or white flowers in June.

B. calycina (*Syn. Franciscea calycina*), 2 ft. high with purple fragrant flowers in summer. *Eximia* is a variety with rich purple flowers fading to almost pure white; and *macrantha* (*Syn. B. grandiflora*) has dark green leaves and rich purple flowers with a lavender ring round a white eye at the mouth of the tube.

B. hopeana (*Syn. Franciscea hopeana*) has rich dark green leaves and small lavender-blue and white flowers.

B. latifolia (*Syn. Franciscea latifolia*) is 2 to 3 ft. high with white, lavender or purple flowers in winter or early spring.

BURCHELLIA (*Bufflehorn-Wood*)

Dwarf evergreen flowering shrub with scarlet flowers.

Time of flowering. March to May.

Propagation. Cuttings of young shoots from March to May in a temperature of 75 deg. F.

Position. Well-drained pots in warm house.

Temperature. March to September, 65 deg. to 75 deg. F.
September to March, 45 deg. to 55 deg. F.

General management. Re-pot in March. Water freely in summer, moderately at other times.

Species cultivated.

B. capensis.

CALLISTEMON (*Bottle Brush Tree*)

Evergreen shrubs with leathery leaves and dense spikes of flowers.

Time of flowering. June.

Propagation.

- (1) Cuttings of ripe shoots, 3 ins. long in summer under a bell-glass in a temperature of 55 deg. to 65 deg. F.
- (2) Seeds when available, but the seedlings take years before they reach the flowering stage.

Position. Pots or well-drained border, in sunny, well-ventilated house.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 40 deg. to 50 deg. F.

General management. Re-pot every two or three years or plant in March or April. Water freely in summer, moderately afterwards, but they should never be allowed to become dry at the roots. Syringe the foliage during hot weather.

Pruning. After flowering, cut back lightly.

Species cultivated.

C. lanceolatus grows 8 to 10 ft. high, and bears bright crimson flowers (*Syn. C. citrinus*, *Metrosideros floribunda*, *M. semperflorens* and *M. citrina*).

CAMELLIA (*Tea-Plant*)

Large evergreen flowering shrubs, not suitable for small houses.

Time of flowering. Early spring.

Propagation.

- (1) Cuttings of firm shoots in July.
- (2) Layering in September.
- (3) Grafting in March.
- (4) Seeds sown in March in temperature of 75 deg. F.

Position. Large pots or tubs or in borders. Pot plants may be stood outside from June to September.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 50 deg. to 55 deg. F.

Feeding. Feed once a week from August to March.

General management. Re-pot every three years in March or April, or top dress those plants in borders. Water freely in summer, moderately in winter, and syringe daily during the summer.

Pruning. March. Very little is necessary. Straggling shoots only should be shortened.

Species cultivated.

C. japonica is the parent of the majority of the varieties which may be obtained. A good selection includes *Lavinia Maggi*, white flaked with rose pink; *Mathotiana alba*, white; *Mathotiana rubra*, a large carmine; *Princess Bacciochi*, carmine with white stripes; *Chandleri elegans*, with large semi-double blooms of a rich soft pink, sometimes spotted with white; *imbricata*, deep carmine; *Conklaari*, a semi-double, light rich red with white spots, and *Preston Rose*, a rose pink.

CASSIA (*Senna Plant*)

An evergreen, growing 6 to 10 ft. high, producing bunches of yellow, pea-like flowers.

Time of flowering. Summer and autumn.

Propagation. Cuttings of half-ripe shoots in spring or early summer in temperature of 80 deg. F.

Position. Well-drained pots which may be stood outside from June to September.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 50 deg. to 55 deg. F.

General management. Re-pot in March. Water freely in summer, but very little is needed in winter.

Pruning. In December or January cut back straggling shoots to within 2 ins. of their base.

Species cultivated.

C. corymbosa.

CENTRADENIA

Dwarf evergreen flowering shrub.

Time of flowering. July.

Propagation. Cuttings of side-shoots 2 to 3 ins. long in February and March in a temperature of 85 deg. F.

Position. Pots in the sun.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Re-pot in February. Water freely in spring and summer, moderately at other times.

Species cultivated.

C. floribunda, red.

CHOISYA (*Mexican Orange-Flower*)

Hardy evergreen flowering shrub with white flowers, suitable for culture in pots.

Time of flowering. Summer.

Propagation. Cuttings of shoots, 3 ins. long from March to June in a temperature of 55 deg. to 65 deg. F.

Position. Pots in cool house from November to May, outside for the remainder of the year.

Temperature. 45 deg. to 50 deg. F.

General management. Re-pot September or October. Water moderately in autumn and winter, freely at other times.

Pruning. Shorten back straggling shoots after flowering.

Species cultivated.

C. ternata, up to 6 ft. high.

CHORIZEMA

Evergreen flowering shrubs with red and yellow flowers.

Time of flowering. April.

Propagation.

(1) Cuttings in summer in a temperature of 65 deg. F.

(2) Seeds sown in March in temperature of 65 deg. to 70 deg. F.

Position. Pots or well-drained borders. Pot plants may be put outside from July to September.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 45 deg. to 50 deg. F.

General management. Re-pot firmly in March or June. Water freely in spring and summer, moderately at other times.

Pruning. Cut back straggling shoots lightly after flowering.

Species cultivated.

C. cordatum.

CITRUS (*Orange*)

Evergreen shrubs with white fragrant flowers and large orange fruits.

Time of flowering. May or July.

Propagation.

(1) Cuttings in July.

(2) Layering in October.

(3) Grafting in March.

(4) Budding in August.

(5) Seeds sown $\frac{1}{2}$ in. deep in March in a temperature of 55 deg. F.

Position. Well-drained pots, tubs or beds. Trees in pots or tubs may be stood in a sheltered position outside from June to September.

Temperature. February to September, 55 deg. to 65 deg. F.
September to February, 45 deg. to 50 deg. F.

Feeding. Feed once a week from May to October.

General management. Re-pot when necessary from February to April. Water freely in spring and summer, moderately at other times. Syringe once a day in summer.

Pruning. Cut back into shape in March.

Species cultivated.

C. aurantium japonica (*Syn. Fortunella japonica*),
Kumquat or Otaheite Orange.

C. sinensis, Common or Sweet Orange.

COLUMNEA

Evergreen trailing shrubs with scarlet and yellow flowers.

Time of flowering. June.

Propagation. Cuttings of firm shoots 3 ins. long in February in temperature of 85 deg. F.

Compost. Equal parts of peat, sphagnum moss and charcoal.

Position. Hanging baskets.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

Feeding. Give liquid manure at least once a week during the summer.

General management. Plant in March. Water freely in summer, moderately at other times.

Species cultivated.

C. gloriosa.

CORONILLA (*Crown Vetch*, *Scorpion Senna*)

An evergreen shrub with numerous fragrant, yellow pea-like flowers.

Time of flowering. Spring and summer.

Propagation.

(1) Cuttings of young shoots in April in a temperature of 55 deg. F. or in August in a cold frame.

(2) Seeds sown in March in temperature of 75 deg. F.

Position. Pots may be put outside from June to September.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 40 deg. to 45 deg. F.

General management. Re-pot in March. Plenty of water is needed in summer, but little in winter.

Pruning. Bushes need clipping back into shape in March.

Species cultivated.

C. glauca. The variety *variegata* has variegated foliage.

CORREA (*Australian Fuchsia*)

Pretty evergreen shrubs, 3 to 6 ft. high.

Time of flowering. Spring and summer.

Propagation.

(1) Cuttings in April in temperature of 65 deg. to 75 deg. F.

(2) Side grafting in heat in March, on to *C. alba* or *Eriostemon buxifolius*.

Position. Well-drained pots in light well-ventilated house. Pots may be put outside during August and September if weather is fine.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 40 deg. to 45 deg. F.

General management. Re-pot when necessary in July

when new growth begins. Careful watering is necessary at all times, very little being needed in the winter, syringe freely in bright weather.

Pruning. Directly after flowering, cut back all shoots which have flowered, to maintain a well-shaped bush.

Species cultivated.

C. cardinalis, scarlet tipped with green.

C. speciosa, scarlet, its variety *ventricosa* is bright crimson tipped with green.

Note.—In some catalogues the spelling is *Corroea*.

CROSSANDRA

Dwarf evergreen shrub with orange-scarlet flowers.

Time of flowering. March.

Propagation. Cuttings of shoots 2 to 3 ins. long at any time in a temperature of 85 deg. F.

Position. Pots in warm, moist house.

Temperature. March to October, 75 deg. to 85 deg. F.

October to March, 55 deg. to 65 deg. F.

General management. Re-pot in March. Water moderately in winter, freely at other times.

Species cultivated.

C. infundibuliformis (Syn. *C. undulaefolia*).

CYTISUS (*Broom*)

One species is often grown in pots. It makes a compact bush and produces freely bunches of small, fragrant, yellow laburnum-like flowers.

Time of flowering. Spring and early summer.

Propagation.

(1) Heel cuttings in March or August, of young shoots 2 ins. to 3 ins. long in temperature of 75 deg. to 80 deg. F.

(2) Seeds sown in March in temperature of 65 deg. to 70 deg. F. Seedlings do not always come true to type.

Position. Pots, which may be stood outside in sun from July to October.

Temperature. October to February, 45 deg. to 50 deg. F.
February to May, 50 deg. to 55 deg. F.
May to June, 55 deg. to 60 deg. F.

Feeding. Feed once a week when the plants are in flower.

General management. Re-pot in May or June. Young plants should be stopped two or three times to produce bushy growth. Water freely from March to May and from June to November, but moderately at other times. Syringe freely in hot weather.

Pruning. After flowering cut back shoots to within 2 ins. of their base.

Species cultivated.

C. fragrans (Syn. *C. racemosus*).

DAPHNE

Small evergreen shrubs with fragrant flowers.

Time of flowering. March.

Propagation.

- (1) Cuttings of well-ripened side-shoots in October and November in a temperature of 50 deg. to 55 deg. F.
- (2) Layers in March or April.
- (3) Grafting in spring on to seedling plants of *D. laureola* or *D. pontica*.

Position. Airy house from September to June; outside for remainder of year.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 40 deg. to 50 deg. F.

General management. Re-pot in March or April after flowering. Very little water is needed in winter, but should be given freely in summer; syringe plants on hot days. Always use lime-free soil.

Pruning. Cut back young shoots into shape in June.

Species cultivated.

D. indica, also known as *D. odora*, has red flowers. There is also a white variety

DATURA

Large evergreens, with enormous trumpet-shaped flowers, only suitable for large houses.

Time of flowering. Summer and early autumn.

Propagation. Cuttings of shoots 6 ins. long in spring or autumn in a temperature of 65 deg. to 75 deg. F.

Position. Large pots or tubs, or planted in the borders of a sunny house. Pot plants may be stood outside in sun from June to September.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 45 deg. to 55 deg. F.

Feeding. Feed occasionally while the plants are in flower.

General management. Re-pot, top dress or plant in March. Water freely in the summer, but very little in the winter. Syringe the plant freely during the growing period.

Species cultivated.

D. arborea, white, 7 to 10 ft.

DESFONTAINEA

Hardy evergreen shrub with dark shiny green oval leaves with spiny edges, and scarlet and yellow flowers. Suitable for greenhouse culture.

Time of flowering. August.

Propagation. Cuttings in spring in a temperature of 55 deg. to 65 deg. F.

Position. Well-drained pots, tubs or borders.

Temperature. 40 deg. to 45 deg. F.

General management. Re-pot or plant in March or April. Water moderately in winter, freely at other times.

Species cultivated.

D. spinosa, 2 to 4 ft. high.

DEUTZIA (*Japanese Snow-Flower*)

Although hardy shrubs, at least one species is suitable for growing in pots. The leaves are deciduous and the flowers small and white and produced in large numbers.

Time of flowering. Spring.

Propagation. Cuttings of young shoots 3 ins. long in spring.

Position. In pots in house February to May ; outside May to November, and in a cold frame from November until February.

Temperature. 55 deg. to 65 deg. F.

Feeding. Feed occasionally.

General management. Pot up in October or November. Water moderately in spring, freely in summer, but give little at other times. Although not necessary, it is advisable after flowering to plant the bushes outside for a year, when they may again be lifted for pot work.

Pruning. After flowering, cut away as much as possible of the old wood which has borne flowers.

Species cultivated.

D. gracilis.

DIOSMA (*African Steel-Bush*)

Dwarf evergreen shrubs with fragrant foliage.

Time of flowering. Spring.

Propagation. Cuttings in spring in a temperature of 60 deg. F.

Position. Pots in cool house.

Temperature. March to September, 50 deg. to 55 deg. F.
September to March, 40 deg. to 45 deg. F.

General Management. Re-pot in May or June. Water moderately in summer, but little should be given in winter.

Pruning. Pinch back vigorous shoots in summer to promote bushy growth.

Species cultivated.

D. capitata (Syn. *Audouinia capitata*) has small leaves and small crimson flowers.

EPACRIS (*Australian Heath, Tasmanian Heath*)

Small evergreen shrubs with heath-like flowers.

Time of flowering. March to June.

Propagation.

(1) Cuttings of young shoots in May or June or August.

(2) Seeds sown as soon as they are ripe in a temperature of 55 deg. F.

Compost. 3 parts fibrous peat, 1 part silver sand.

Position. In a light, well-ventilated house from September to July; outside in a sunny place for the rest of the year.

Temperature. September to March, 45 deg. to 50 deg. F.
March to July, 55 deg. to 60 deg. F.

General management. Re-pot firmly in April, May or June. Water moderately at all times. Syringe plants daily from March to July.

Pruning. Directly after flowering cut back shoots of erect kinds to within 1 in. of their base. Pendulous kinds are just cut back into shape.

Species cultivated. Many hybrids and varieties may be obtained in white, pink or red.

ERICA (*Heath*)

Shrubby evergreen plants 1 to 2½ ft. high. They may be divided into two groups, the hard-wooded kinds which are rather difficult to grow, and the soft-wooded types which are seen in the markets as pot plants.

Times of flowering. December to August.

Propagation. Cuttings of shoots 1 in. long in spring in temperature of 60 deg. to 70 deg. F.

Compost. 3 parts of good fibrous peat well broken up and 1 part sharp silver sand, and if possible 1 part "pulled" or rough peat.

Position. Light, airy house October to July, outside in the sun July to October.

Temperature. October to March, 40 deg. to 45 deg. F.
March to July, 45 deg. to 55 deg. F.

Feeding. Feed occasionally.

General management. Re-pot firmly autumn and winter-flowering kinds in March, and summer-flowering sorts in September. Water carefully, always seeing that the soil is sufficiently moist. It is important to use rain water.

Pruning. Immediately after flowering. Slow growers only require strong shoots pinching back into shape. Free growing kinds should have strongest growths cut back to within 1 or 2 ins. of their base and the weakest shoots tipped.

Species cultivated.*Hard-wooded kinds :*

E. Cavendishiana (sometimes known as **E. Cavendishii**), a rich yellow, flowering from May to July.

E. ventricosa, purplish-red, from June to August.

Soft-wooded kinds :

E. gracilis autumnalis, rosy-pink, February to March.

E. gracilis nivalis, white, December to January.

E. hyemalis, pink, December to March.

ERIOSTEMON

Small evergreen shrubs.

Time of flowering. May and June.

Propagation.

(1) Cuttings in March or August, of half-ripe shoots 2 ins. long, in a temperature of 60 deg. F.

(2) Grafting on to stocks of *Correa alba* in March.

Position. Well-drained pots in light airy house. Outside in the sun from July to September.

Temperature. April to September, 50 deg. to 60 deg. F.

September to April, 40 deg. to 45 deg. F.

General management. Re-pot firmly in March. Water carefully at all times. Syringe daily in summer.

Pruning. Cut back straggling growths in February.

Species cultivated. Species and varieties are pink, red or white in colour.

ERYTHRINA (Coral-Tree)

Deciduous shrub bearing bunches of pea-shaped, scarlet flowers.

Time of flowering. June to August.

Propagation. Heel cuttings of young shoots in spring in temperature of 75 deg. F.

Position. Pots in warm house.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 45 deg. to 60 deg. F.

Feeding. Feed frequently when plants are well-rooted.

General management. Re-pot in March. Water freely from April to September, but keep almost dry for the rest of the year. Store pots on their sides during winter.

Pruning. Cut back shoots close to their base in November.

Species cultivated.

E. Crista-galli, 6 to 8 ft. high.

EUCALYPTUS (*Australian Gum*)

Most species develop into large timber trees, but there are several suitable for pot culture, in the young stages. The leaves are evergreen and are covered with a greyish bloom and are pleasantly scented.

Propagation.

(1) Cuttings of side-shoots in gentle bottom heat.

(2) Seeds sown in early spring in a temperature of 65 deg. F.

Position. Pots in warm house.

Temperature. 45 deg. to 50 deg. F. in winter.

55 deg. to 60 deg. F. in summer.

General management. The best plan is to raise young plants from seed each year, otherwise re-pot in March or April. Water moderately in winter, freely in summer.

Pruning. None is required.

Species cultivated.

E. citriodora, the Citron-scented Gum.

E. globulus, the Blue Gum.

EUGENIA (*Fruiting Myrtle*)

Evergreen shrub with narrow leaves, white flowers and globular, fragrant fruits.

Time of flowering. Summer.

Propagation. Cuttings of firm shoots in summer in a temperature of 55 deg. to 75 deg. F.

Position. Pots in warm house.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 40 deg. to 50 deg. F.

General management. Re-pot in February or March. Water freely in summer, moderately at other times. Syringe during the summer.

Pruning. Cut back straggling shoots in March.

Species cultivated.

E. myriophylla, 6 ft. high.

EUPHORBIA

Flowering shrubs, some with ornamental leaves and bracts.

Time of flowering. Summer to winter.

Propagation. Cuttings of young shoots 3 ins. long from May to July in a temperature of 70 deg. F.

Position. Pots in the sun.

Temperature. January to May, 50 deg. to 55 deg. F.

May to September, 65 deg. to 75 deg. F.

September to January, 55 deg. to 65 deg. F.

General management. Re-pot in March or June. Water moderately from September to January; keep almost dry from January to May and water freely for the rest of the year.

Pruning. Cut back shoots of *E. fulgens* to within 1 in. of their base in June.

Species cultivated.

E. fulgens (*Syn. E. jacquinaeflora*), Scarlet Plume, 2 to 3 ft. high, with scarlet flowers in autumn and winter.

E. splendens, Crown-of-thorns, 4 ft. high with red flowers in summer. The stems are spiny and the bracts bright red.

EURYA

A dwarf evergreen shrub.

Propagation. Cuttings of young shoots in spring in temperature of 60 deg. to 65 deg. F.

Position. Pots in cool house.

Temperature. 45 deg. to 50 deg. F.

General management. Re-pot in March or April. Water freely in summer, moderately at other times.

Pruning. Little required.

Species cultivated.

E. japonica variegata (*Syn. E. latifolia variegata*), grows about 5 ft. high, with green and creamy-white leaves.

FABIANA (*False Heath*)

Dwarf evergreen shrubs with heath-like foliage and white flowers.

Time of flowering. Spring.

Propagation. Cuttings of firm young shoots in April or August in cold frame.

Position. Pots in cool house.

Temperature. 40 deg. to 45 deg. F.

General management. Re-pot in summer. Keep the roots fairly moist all the year round.

Pruning. Cut back shoots lightly after flowering.

Species cultivated.

F. imbricata, 3 ft. high.

FATSIA (*Fig Leaf Palm, Japanese Aralia*)

Evergreen shrub with large, leathery leaves.

Propagation.

(1) Cuttings of stems 2 ins. long in spring.

(2) Cuttings of roots in March or April in temperature of 80 deg. F.

(3) Variegated kinds are grafted on to common species in March or April in temperature of 75 deg. F.

(4) Stem rooting in spring for tall plants.

(5) Seeds sown in temperature of 65 deg. F.

Position. Well-drained pots in cool house.

Temperature. April to September, 55 deg. to 65 deg. F.

September to April, 40 deg. to 50 deg. F.

General management. Re-pot in spring. Water freely in summer, moderately at other times.

Species cultivated.

F. japonica (*Syn. Aralia Sieboldii*). Leaves are deep green and shiny. There is a variegated variety, the leaves of which are marked with white.

FICUS

Evergreen shrubs with decorative foliage.

Propagation.

- (1) Cuttings of shoots in spring and summer in a temperature of 75 deg. F.
- (2) "Eyes," i.e., small pieces of stem about 1 in. long containing a bud, with a leaf attached, in a temperature of 75 deg. F.
- (3) Stem rooting in spring.

Position. In pots or beds, shaded from strong sunlight.

Temperature. February to October, 65 deg. to 75 deg. F.
October to February, 55 deg. to 60 deg. F.

General management. Pot or plant from February to April. Water freely in summer, moderately at other times. Syringe daily in hot weather.

Species cultivated.

F. rubiginosa variegata (*Syn. F. australis variegata*). The leaves have a rusty appearance underneath.

F. elastica (India-rubber plant) has large leathery green leaves 6 to 18 ins. long and 3 to 6 ins. wide. There is also a variegated variety.

F. radicans is a creeping species and the variety *variegata* has leaves variegated with silver.

F. Parcelli has green and white leaves.

F. repens (*Syn. F. pumila*) is another green-leaved, creeping species. The variety *minima* has smaller leaves, and *variegata* has variegated leaves.

F. pandurata (*Syn. F. lyrata*) has large, fiddle-shaped leaves.

FUCHSIA (*Lady's Ear Drops*)

Attractive flowering shrubby plants.

Time of flowering. Summer.

Propagation.

- (1) Cuttings of young shoots from January to March, in temperature of 70 deg. to 80 deg. F., or from April to June or September, in cool house.

- (2) Seeds sown in March or April in a temperature of 55 deg. F.

Position. Pots in house shaded from strong sunlight from March to July; outside in the sun from July to October; in a cool, dry place for the rest of the year.

Temperature. October to February, 40 deg. to 45 deg. F.
February to October, 55 deg. to 65 deg. F.

Feeding. Feed once a week when the plants are well established.

General management. Re-pot old plants in February or March; young plants as they need it. Pinch young shoots frequently to make plants bushy. Water moderately March to May, freely May to October and very little at other times.

Syringe plants daily from February till May.

Pruning. Cut back fairly hard in February.

Species cultivated. Numerous hybrids and varieties may be found in nurserymen's catalogues.

GARDENIA

Evergreen shrubs very much prized for their fragrant white flowers.

Time of flowering. Spring and summer.

Propagation. Cuttings of firm young side-shoots 2 to 3 ins. long from January to April in a temperature of 70 deg. F.

Position. Well-drained pots or beds shaded from strong sunshine.

Temperature. March to September, 65 deg. to 85 deg. F.
September to March, 55 deg. to 65 deg. F.

Feeding. Feed occasionally when plants are in flower.

General management. Re-pot or plant in February or March. Water freely in summer, moderately in winter. Syringe daily in spring and summer except when in bloom. One or two-year old plants produce the best flowers.

Pruning. Cut back into shape in February.

Species cultivated.

G. citriodora (Syn. *Mitriostigma axillaris*), the Citron-scented Gardenia 3 to 5 ft. high with white, fragrant flowers in spring.

G. jasminoides (*Syn. G. radicans* and *G. florida*), the Cape Jasmine has fragrant white flowers in summer, the variety *intermedia* is an improvement on the type. There are also several excellent named varieties, e.g. Carolina Valvassori, Commendatore V. Stringher, Dr. Anton Tricavelli, Mystery, Professor Angiolo Pucci, Prof. Santa Lanchini, Regina Santa de Sapore and René Touchard.

GLONERIA

Dwarf evergreen shrub with snow-white flowers.

Time of flowering. Summer.

Propagation. Cuttings in spring in a temperature of 75 deg. to 85 deg. F.

Position. Pots in shade while growing; in light part of house during resting period.

Temperature. March to September, 75 deg. to 85 deg. F.

September to March, 55 deg. to 65 deg. F.

Feeding. Feed once a week when the plants are in flower.

General management. Re-pot in February or March. Water freely in spring and summer, moderately at other times. Syringe twice a day during spring and summer.

Pruning. Cut back into shape in February.

Species cultivated.

G. jasminiflora (*Syn. Psychotria jasminiflora*).

GREVILLEA (*Silk-Bark Oak*)

Evergreen shrubs with flowers and ornamental foliage.

Time of flowering. Summer.

Propagation.

(1) Heel cuttings of young shoots 3 ins. long from March to May in a temperature of 75 deg. to 80 deg. F.

(2) Seeds sown $\frac{1}{4}$ in. deep in March in temperature of 65 deg. to 70 deg. F. The seeds are large and flat and should be placed in the pots point downwards or sideways, not flat.

Position. Well-drained pots in airy house.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 45 deg. to 55 deg. F.

General management. Re-pot firmly in March or April. Water freely in summer, moderately at other times.

Pruning. None for *G. robusta*. Other species need cutting back occasionally to keep them bushy and of a good shape.

Species cultivated.

G. robusta, orange flowers in summer and fern-like leaves.

G. rosmarinifolia, red flowers in summer. A form sometimes quoted in catalogues is *Thelemanniana* or *Pressei*, with bright deep red flowers tipped with yellow.

HABROTHAMNUS (*Bastard Jasmine*)

Evergreen or semi-evergreen flowering shrubs.

Time of flowering. Spring and summer.

Propagation. Heel cuttings of side-shoots 3 or 4 ins. long from July to September in a temperature of 65 deg. to 75 deg. F.

Position. Pots or beds.

Temperature. March to September, 55 deg. to 60 deg. F.
September to March, 40 deg. to 50 deg. F.

General management. Re-pot in March. Water moderately in winter, freely at other times.

Pruning. Cut back into shape in February.

Species cultivated.

H. aurantiacus (*Cestrum aurantiacum*), orange-yellow.

H. elegans (*Cestrum elegans*), carmine.

H. fasciculatus (*Cestrum fasciculatum*), purplish-red; the variety *Newellii* is crimson.

HELIO'TROPIUM (*Heliotrope, Cherry Pie*)

Shrubs with fragrant flowers.

Time of flowering. Spring to winter.

Propagation.

(1) Cuttings of young shoots 2 to 3 ins. long in March, April, August or September in a temperature of 65 deg. to 75 deg. F.

(2) Seeds sown in March in temperature of 65 deg. to 75 deg. F.

Position. Pots or beds. Makes quite good standards.

Temperature. February to October, 60 deg. to 70 deg. F.
October to February, 50 deg. to 55 deg. F.

Feeding. Feed once a week when in flower.

General management. Pot or plant February to May.
Water freely in summer, moderately at other times.

Pruning. Cut back old plants closely in February. Young plants should be pinched back to produce bushy growth.

Species cultivated. Many varieties of the species *H. peruvianum* may be obtained.

HIBISCUS

Evergreen shrub with large, rose-like flowers.

Time of flowering. Summer.

Propagation.

(1) Cuttings of firm shoots in spring or summer in a temperature of 75 deg. F.

(2) Grafting in March.

(3) Seeds sown in March in temperature of 75 deg. F.

Position. Well-drained pots or beds.

Temperature. March to October, 65 deg. to 75 deg. F.
October to March, 55 deg. to 65 deg. F.

General management. Re-pot or plant in February or March. Water copiously in spring and summer, moderately at other times.

Pruning. Cut back into shape in February.

Species cultivated.

H. schizopetalus, with orange-red flowers.

H. sinensis (*Syn. H. rosa-sinensis*), Rose of China, flowers all shades from white to rose-red, sometimes double. The variety *Cooperi* has narrow leaves, variegated with white, and small scarlet flowers.

HYDRANGEA

Deciduous shrubby plants with large heads of flowers.

Time of flowering. Spring and summer.

Propagation. Cuttings of young shoots in March or April

in a temperature of 50 deg. to 60 deg. F., or of firm shoots 2 to 3 ins. long in August in a cold frame.

Position. Pots in cool house.

Temperature. 55 deg. to 65 deg. F.

Feeding. Feed once a week when plants are growing vigorously.

General management. Re-pot in February or March. Give plenty of water in summer, but very little in winter.

Pink varieties, especially rich pink shades, may be tinged blue by treating the soil or the water. The best substance appears to be aluminium sulphate, crystals of which are added to the soil when potting the plants; $\frac{1}{4}$ oz. to each 5-in. pot or $\frac{1}{2}$ oz. to each 6-in. pot. If added in water, $\frac{3}{4}$ oz. is sufficient for one gallon, and must first be dissolved in a little hot water. To be successful, the soil must be free from lime. White varieties will not respond to the treatment.

Pruning. In August or September remove weak shoots and cut back those which have flowered.

Species cultivated.

H. macrophylla is the species usually grown in pots, and there are many good varieties from which to choose. Deep pinks: Ami Pasquier, Deutschland, Europa, Holstein and Gertrud Glahn. Bright pink: Baardse's Favourite and La France. Red: Carmen and Hamburg. Carmine: Elmar, Helge and Heinrich Seidel. Light crimson: Etincelant, and soft pink Florence Bolt.

IXORA (*West Indian Jasmine*)

Evergreen, compact shrubs with trusses of fragrant flowers.

Time of flowering. Summer.

Propagation. Cuttings of firm young shoots 2 to 3 ins. long from March to May, in a temperature of 75 deg. to 85 deg. F.

Position. Well-drained pots in the shade during growing season, in light part of house during resting period.

Temperature. March to September, 75 deg. to 85 deg. F.
September to March, 55 deg. to 65 deg. F.

Feeding. Feed once or twice a week when plants are in flower.

General management. Re-pot in February or March. Water freely in spring and summer, moderately at other seasons. Syringe twice a day in spring and summer.

Pruning. Cut back into shape in February.

Species cultivated.

I. coccinea, 3 to 4 ft. high, with orange-scarlet flowers.

I. lutea is probably a form of this species with yellow flowers.

I. macrothyrsa (*Syn. I. Duffii*) deep red flowers, tinged with crimson when mature. There are several horticultural forms, e.g. *Dixiana* with orange flowers; *Westii*, pale rose becoming bright pink with age, and *Williamsii* with reddish-salmon coloured flowers.

LAGERSTROEMIA

(*Indian Lilac, Queen's Flower, Cape Myrtle*)

Evergreen flowering shrubs.

Time of flowering. Summer.

Propagation. Cuttings of firm shoots in March, April, August or September in temperature of 65 deg. to 70 deg. F.

Position. Well-drained pots in light house.

Temperature. March to October, 60 deg. to 70 deg. F.

October to March, 45 deg. to 55 deg. F.

Feeding. Feed occasionally when pots are filled with roots.

General management. Re-pot February or March. Water freely in summer, sparingly in winter. Syringe daily during summer.

Pruning. Cut back fairly hard in November or December.

Species cultivated.

L. indica, 6 to 10 ft. high, with bunches of bright pink flowers.

LASIANDRA (*Brazilian Spider-Flower*)

Evergreen shrub with purple flowers.

Time of flowering. Summer.

Propagation. Cuttings of firm side-shoots 3 ins. long from February to September in a temperature of 70 deg. to 80 deg. F.

Position. Well-drained pots, tubs or beds.

Temperature. March to September, 60 deg. to 70 deg. F.
September to March, 45 deg. to 55 deg. F.

Feeding. Feed once a week from May to September.

General management. Pot or plant in February or March. Water freely in summer, moderately at other times.

Pruning. Cut back into shape in February.

Species cultivated.

L. macrantha (Syn. *Gibouchina semidecandra* and *Pteroma macranthum*).

LEONOTIS (*Lion's Ear*)

Dwarf evergreen shrub with orange-scarlet flowers.

Time of flowering. Summer.

Propagation. Cuttings of shoots in March or April in a temperature of 55 deg. to 65 deg. F.

Position. Well-drained pots in light, well-ventilated house from September to June; outside in the sun for the rest of the year.

Temperature. September to April, 40 deg. to 50 deg. F.
April to June, 55 deg. to 65 deg. F.

General management. Re-pot in March or April. Water moderately in spring and summer, sparingly at other times.

Pruning. Cut back into shape after flowering.

Species cultivated.

L. Leonurus.

LUCULIA

Evergreen flowering shrubs with leathery foliage.

Time of flowering. Autumn.

Propagation.

- (1) Cuttings of young shoots in June or July in temperature of 70 deg. to 80 deg. F.
- (2) Seeds sown from February to April in temperature of 60 deg. to 70 deg. F. Seedlings flower when three to five years old.

Position. Large, well-drained pots or beds.

Temperature. April to September, 60 deg. to 70 deg. F.
September to December, 55 deg. to 65 deg. F.
December to April, 45 deg. to 55 deg. F.

General management. Pot or plant between February and April. Water freely from April to November but the roots should be kept almost dry for the rest of the year. Syringe twice a day in summer.

Pruning. After flowering cut back young shoots to 2 or 3 ins.

Species cultivated.

L. gratissima, 8 to 10 ft. with large heads of sweetly-scented pink flowers.

L. pinceana has larger and more fragrant white flowers, which later turn a rosy-pink.

MEDINILLA

Dwarf evergreen flowering shrubs.

Time of flowering. Spring.

Propagation. Cuttings of firm young side-shoots, 3 to 4 ins. long in spring or summer, in a temperature of 85 deg. F.

Position. Pots in sunny, moist part of the house from February to September; in a light fairly dry part at other seasons.

Temperature. February to September, 75 deg. to 85 deg. F.
September to November, 70 deg. to 80 deg. F.
November to February, 60 deg. to 65 deg. F.

Feeding. Feed once a week when plants start to flower.

General management. Re-pot in February. Water freely in spring and summer, moderately at other times. Syringe twice a day in spring and summer.

Pruning. Cut back straggly shoots into shape in January or February.

Species cultivated.

M. Curtisii, white.

M. magnifica, 4 ft. high with rosy-pink flowers.

MUSSAENDA

Evergreen shrubs with yellow flowers.

Time of flowering. Autumn and winter.

Propagation. Cuttings of young shoots from May to July in a temperature of 70 deg. to 80 deg. F.

Position. Well-drained pots in a light part of the house.

Temperature. February to October, 65 deg. to 85 deg. F.
October to February, 55 deg. to 65 deg. F.

General management. Re-pot from February to April. Water freely from April to September; moderately from February to April and September to November, and keep almost dry during the remaining months. Syringe once a day in spring and summer.

Pruning. Cut back and thin lightly after flowering.

Species cultivated.

M. erythrophylla, 1 ft. high with crimson bracts.

M. luteola, 5 to 6 ft. high.

MYRTUS (*Myrtle*)

Evergreen shrub with ornamental green fragrant foliage, and white sweetly-scented flowers followed by oblong or round, purplish-black berries which are fragrant and edible.

Time of flowering. May to July.

Propagation.

(1) Cuttings of young shoots, 2 ins. long in spring or summer in temperature of 65 deg. to 75 deg. F.

(2) Heel cuttings of firm shoots 2 to 3 ins. long in autumn in temperature of 60 deg. F.

Position. Well-drained pots, tubs or borders. Pots may be stood outside in sunny place from June to September.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 45 deg. to 50 deg. F.

Feeding. Feed once a week during the summer.

General management. Pot or plant in February or March. Water copiously in summer, moderately afterwards. Syringe once a day during the summer.

Pruning. Cut back into shape in February.

Species cultivated.

M. communis, the Common Myrtle, 6 to 8 ft. high.

NERIUM (*Oleander*, *Rose Bay*)

Evergreen shrubs with fragrant flowers.

Time of flowering. Summer.

Propagation. Cuttings of firm young shoots 3 to 6 ins. long in spring or summer in a temperature of 60 deg. to 70 deg. F.

Position. Pots, tubs or well-drained beds in a sunny part of the house. Plants in pots or tubs may be stood outside from June till September.

Temperature. September to March, 45 deg. to 55 deg. F.
March to June, 55 deg. to 65 deg. F.

Feeding. Feed once or twice a week during the summer.

General management. Re-pot or plant in February or March. Water copiously in spring and summer, moderately in autumn, and keep almost dry in winter. Syringe twice a day from March to June.

Pruning. Immediately after flowering, or in October, shorten back shoots of previous year's growth to within 3 or 4 ins. of their base. Remove young shoots that are produced from the bases of the flower trusses as soon as they appear.

Species cultivated.

N. Oleander is the common type with rosy flowers. The variety *album plenum* is a double white; and *splendens* is a double red.

OCHNA

Evergreen shrubs with yellow flowers, followed by black and crimson globular fruits.

Time of flowering. Spring.

Propagation. Cuttings of firm shoots 2 to 3 ins. long in summer in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots in the sun.

Temperature. March to September, 70 deg. to 75 deg. F.
September to March, 45 deg. to 55 deg. F.

General management. Re-pot in February or March.

Water freely in spring and summer, moderately at other times.
Syringe once a day in spring and summer.

Pruning. Cut back into shape in February.

Species cultivated.

O. multiflora, 6 ft. high.

OLEA (*Olive*)

Evergreen shrub with white fragrant flowers.

Time of flowering. Summer.

Propagation.

(1) Cuttings in summer.

(2) Seeds sown in spring or autumn.

Position. September to May in pots in a cool greenhouse, outside for the rest of the year.

Temperature. September to May, 40 deg. to 50 deg. F.

General management. Re-pot in March. Water freely in summer, moderately at other times. Syringe once a day in summer.

Pruning. Thin out when necessary.

Species cultivated.

O. europaea, the Wild Olive.

PAVETTA

Dwarf shrub with white flowers and ornamental leaves.

Time of flowering. June to August

Propagation. Cuttings of firm young shoots 2 to 3 ins. long from March to May in a temperature of 75 deg. to 85 deg. F.

Position. Well-drained pots in shade while growing, in light part of house when plants are resting.

Temperature. March to September, 60 deg. to 70 deg. F.

September to March, 45 deg. to 55 deg. F

Feeding. Feed once or twice a week when plants are in flower.

General management. Re-pot in February or March. Water freely in spring and summer, moderately at other times. Syringe twice a day in spring and summer.

Pruning. Cut back into shape in February.

Species cultivated.

P. caffra, 3 to 4 ft. high.

PHYLLAGATHIS

Shrub 1 to 2 ft. high, with pink flowers, large glossy green and tinged with metallic blue and purple, and red beneath.

Time of flowering. July.

Propagation. Leaf cuttings in a temperature of 85 deg. F. and bottom heat.

Position. Well-drained pots.

Temperature. March to September, 75 deg. to 85 deg. F.

September to March, 60 deg. to 65 deg. F.

General management. Re-pot in March. Water copiously during the growing season, moderately at other times. A moist atmosphere is essential during the summer.

Species cultivated.

P. rotundifolia.

PIMELEA (*Rice Flower*)

Dwarf evergreen shrubs with pink flowers freely produced.

Time of flowering. May.

Propagation.

(1) Cuttings of young shoots, 2 ins. long in March or April, in a temperature of 55 deg. to 65 deg. F.

(2) Seeds sown from February to May in a similar temperature.

Position. Well-drained pots in a light well-ventilated house.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 40 deg. to 50 deg. F.

General management. Re-pot firmly as soon as new growth starts in the spring. Water freely in summer, moderately at other times. Syringe during summer.

Pruning. Cut back into shape immediately after flowering, removing all the dead flower heads. Stop young shoots occasionally to induce bushy growth.

Species cultivated.

P. ferruginea (*Syn. P. decussata*).

POINSETTIA

Shrubby plants with insignificant flowers but the bracts are bright red or white. The leaves are green or variegated with creamy-white.

Time of flowering. Autumn.

Propagation. Cuttings of young shoots 2 to 3 ins. long in May with bottom heat of 85 deg. F.

Position. In pots in a cold frame shaded from the midday sun from July to September, afterwards in warm house.

Temperature. September to April, 55 deg. to 60 deg. F.
April to July, 65 deg. to 75 deg. F.

Feeding. Feed twice a week from October till the bracts are fully developed.

General management. Re-pot in spring. Water and syringe freely while growing, after flowering keep quite dry.

Pruning. Cut back shoots to 2 or 3 buds in April.

Species cultivated.

P. pulcherrima (*Syn. Euphorbia pulcherrima*), 3 to 6 ft. high, with scarlet bracts. *Alba* is a white variety and *rosea* pink.

POLYGALA (*Milk Wort*)

Evergreen shrubby plant 4 to 6 ft. high, with rich purple pea-shaped flowers.

Time of flowering. April till June.

Propagation. Cuttings of young shoots 3 ins. long in spring in a temperature of 50 deg. F.

Position. Well-drained pots in a well-ventilated house. Shaded from midday sun. Place in a cold frame from July to September.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 40 deg. to 50 deg. F.

General management. Re-pot in February or March. Water freely in summer, moderately at other times. Syringe twice a day in bright weather except when the plants are in bloom.

Pruning. Cut back straggly shoots into shape in February.

Species cultivated.

P. dalmatiana.

PUNICA (*Pomegranate*)

Fairly large deciduous trees with roundish golden-red fruits. Suitable for small houses in the seedling stage.

Time of flowering. June to September.

Propagation. Double-flowered kinds :

- (1) Cuttings of firm shoots 6 to 8 ins. long.
- (2) Layering shoots in October or November.
- (3) Grafting on single-flowered species in March.
- (4) Seeds sown in spring in a temperature of 55 deg. to 65 deg. F.

Position. In well-drained pots, tubs or borders with shoots trained against a wall.

Temperature. 40 deg. to 45 deg. F.

General management. Pot or plant from October to February. Water freely in summer, moderately in autumn and spring, none in winter.

Pruning. Cut back weak shoots only in early spring.

Species cultivated.

P. Granatum, red flowers ; the variety *flore-pleno* is double and *Legrellei* has double flowers striped with red and yellow on the outside.

RHODODENDRON

Greenhouse kinds are not so popular as they were at one time, but well-grown plants make a fine display.

Time of flowering. Careful selection will give bloom for the greater part of the year.

Compost. Two parts turfy loam, one part peat, one part silver sand.

Position. Well-drained pots or tubs outside in the sun from June to September, in warm house for the rest of the year.

Temperature. March to June, 55 deg. to 65 deg. F.
September to March, 45 deg. to 55 deg. F.

Feeding. Feed occasionally when the buds show.

General management. Re-pot firmly every three or four years in April or May, or directly after flowering. Water freely in summer, moderately at other times, using rain water if possible, since the plants will not tolerate water containing lime.

Pruning. Cut back straggly growths only, and remove seed pods after flowering.

Species cultivated.

R. jasminiflorum, 3 ft. high with white and pink flowers in May. There are many hybrids between this species and *R. javanicum*, e.g. Brilliant, large brilliant scarlet flowers; Indian Yellow, a rich orange yellow; Ne Plus Ultra, crimson-scarlet; Princess Royal, a light rose-pink with a darker centre; and Triumphans, crimson-scarlet.

RONDELETIA

Evergreen shrub, 4 to 6 ft. high, with fragrant tubular orange-red flowers with a yellow throat.

Time of flowering. Summer.

Propagation. Cuttings of firm shoots in spring or summer, in a temperature of 75 deg. to 85 deg. F.

Position. Well-drained pots in light part of house, but shaded from bright sunshine.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 55 deg. to 60 deg. F.

General management. Re-pot in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day in spring and summer.

Pruning. Cut back lightly after flowering.

Species cultivated.

R. odorata (Syn. *R. splendens* and *R. speciosa*).

RUSSELLIA (Coral-Blow)

Dwarf evergreen shrubs with red two-lipped tubular flowers, suitable for hanging baskets.

Time of flowering. July.

Propagation.

(1) Cuttings in spring in temperature of 75 deg. F.

(2) Layering at any time.

Position. Baskets or pots in light part of house.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 45 deg. to 55 deg. F.

Feeding. Feed once a week when in flower.

General management. Re-pot in February or March. Water freely in summer, moderately at other times. Syringe twice a day in summer except when in flower.

Pruning. Thin lightly in February.

Species cultivated.

R. juncea, 3 to 4 ft. high.

R. Lemoini (or *Lemoiniana*) is a hybrid between *R. juncea* and *R. sarmentosa*.

SANCHEZIA

Ornamental shrub, 3 to 4 ft. high with fairly large tubular yellow and red flowers.

Time of flowering, March to October.

Propagation. Cuttings of young shoots from March to July under a bell-glass.

Position. Shady part of house in spring and summer, light part for the rest of the year.

Temperature. March to September, 75 deg. to 85 deg. F.

September to March, 55 deg. to 65 deg. F.

Feeding. Feed occasionally during the summer.

General management. Re-pot in March. Water freely in spring and summer, moderately at other times. Syringe twice a day in spring and summer.

Species cultivated.

S. nobilis.

SPARMANNIA (*African Hemp*)

An evergreen shrub up to 10 ft. high, but plants 3 to 4 ft. high flower well. The flowers are white and the numerous stamens are sensitive when young and move when touched.

Time of flowering. Summer.

Propagation. Cuttings in spring and summer in a temperature of 55 deg. to 65 deg. F.

Position. Pots in a light, well-ventilated house from September to June, outside in the sun for the rest of the year.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 40 deg. to 50 deg. F.

Feeding. Feed once a week from April to September.

General management. Re-pot in February or March. Water freely in spring and summer, moderately at other times.

Pruning. Cut back fairly close in December or January.

Species cultivated.

S. africana. The variety *flore-pleno* has double flowers.

STROBILANTHES (*Conc Head*)

Dwarf evergreen shrub with long, iridescent leaves, purple beneath and violet flowers in spikes.

Time of flowering. Autumn.

Propagation. Cuttings of fairly firm shoots, 2 to 3 ins. long, from February to April in a temperature of 80 deg. F.

Position. Well-drained pots in a light part of the house.

Temperature. March to September, 75 deg. to 85 deg. F.
September to March, 60 deg. to 65 deg. F.

Feeding. Feed twice a week when plants are in flower.

General management. Re-pot in March or April. Water freely in summer, moderately at other times. Syringe frequently during the growing season. It is important to maintain a moist atmosphere.

Pruning. Cut shoots back closely in February.

Species cultivated.

S. dyerianus.

SWAINSONIA (*Darling River Pea*)

Evergreen shrubs growing 3 or 4 ft. high, with sprays of pea-like flowers useful for cutting.

Time of flowering. Summer.

Propagation.

- (1) Cuttings of young shoots 2 to 3 ins. long from April to July.
- (2) Seeds sown in March or April in a temperature of 55 deg. to 65 deg. F. after being soaked for about an hour in tepid water.

Position. Well-drained pots, tubs or borders in the sun ; outside from June to September.

Temperature. September to March, 35 deg. to 45 deg. F.
March to June, 55 deg. to 65 deg. F.

Feeding. Feed occasionally in summer.

General management. Re-pot or top-dress in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day in summer except when the plants are in flower.

Pruning. Cut back into shape about a fortnight before re-potting.

Species cultivated.

S. galegiefolia, reddish-purple. The variety *alba* has white flowers.

TABERNAEMONTANA

(*Adam's Apple, East Indian Rose Bay*)

Evergreen shrubs about 6 ft. high with yellowish-white flowers.

Time of flowering. June.

Propagation. Cuttings of ripe shoots, 2 to 3 ins. long in February in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots in a light part of the house.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot from February to April. Water freely in spring and summer, moderately at other times. Syringe once a day from March until the flowers appear.

Pruning. Cut back straggling shoots lightly immediately after flowering.

Species cultivated.

T. recurva (*Syn. T. gratissima*).

THYRSACANTHUS (*Thyrse Flower*)

Evergreen shrub, 3 to 6 ft. high, with drooping spikes of tubular red flowers.

Time of flowering. Winter.

Propagation. Cuttings of young shoots from March to July in a temperature of 75 deg. F.

Position. Well-drained pots in light part of house from September to June; outside in a sunny frame for the rest of the year.

Temperature. September to March, 45 deg. to 55 deg. F.
March to June, 65 deg. to 75 deg. F.

Feeding. Feed twice a week when the plants are in flower.

General management. Re-pot in March or April. Water freely in spring and summer, moderately at other times.

Pruning. Cut back shoots to within 1 in. of their base after flowering. Pinch back the young shoots occasionally during the summer to produce bushy growth.

Species cultivated.

T. rutilans (Syn. *Odontonema Schomburgkianum*).

TREVESIA

Stove shrubs with yellowish-white flowers.

Propagation. Cuttings of half-ripened shoots under a bell-glass in a temperature of 80 deg. F.

Position. Large, well-drained pots, shaded from strong sunlight.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in February or March. Water freely during the growing season, moderately at other times. A moist atmosphere is essential during the summer.

Species cultivated.

T. palmata (Syn. *T. sundaica*).

TRISTANIA

Evergreen shrub with small yellow flowers. Not suitable for small houses.

Time of flowering. July to September.

Propagation. Cuttings of half-ripe shoots in July or August, under a bell-glass with gentle bottom heat.

Position. Well-drained pots or borders.

Temperature. March to September, 55 deg. to 65 deg. F.
September to March, 45 deg. to 55 deg. F.

General management. Re-pot in March or April. Water freely during the growing season, moderately at other times.

Species cultivated.

T. nerifolia.

VERONICA

Several of the shrubby species are useful for growing in pots in the greenhouse. They are evergreen with flowers of various shades of pink, red, mauve or purple.

Time of flowering. Early autumn.

Propagation.

(1) Cuttings of half-ripened shoots in August in a cold frame.

(2) *V. hulkeana* by cuttings of young shoots in spring or August.

Position. Pots in the sun. Outside from May to September.

Temperature. 45 deg. to 55 deg. F.

Feeding. Feed once a week during the growing season.

General management. Re-pot in September or March. Water freely in spring and summer, moderately at other times. It is advisable to raise some young plants each year as old ones require large pots and are not really satisfactory if the roots are restricted.

Pruning. Cut back shoots after flowering.

Species cultivated.

V. hulkeana, 4 to 6 ft. high, with lavender flowers.

V. speciosa provides a number of varieties, e.g. Alicia Amherst, deep royal blue; La Séduisante, bright crimson, and Silver Beauty, the leaves of which are variegated with silver.

CLIMBERS

ALLAMANDA

Evergreen climbing plant usually with large yellow funnel-shaped flowers.

Time of flowering. Summer.

Propagation. Cuttings of shoots 3 ins. long of the previous year's growth in January in a temperature of 80 deg. F.

Position. Pots, tubs or borders with the shoots trained close to the roof.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in February. Water in spring and summer, moderately at other times.

Pruning. Cut back shoots closely in January.

Species cultivated.

A. neriifolia, only 3 ft. high, the golden-yellow flowers are streaked with orange.

There are several varieties of **A. cathartica**; *grandiflora*, *Hendersonii* with leathery leaves; *Schottii*, the flowers have a dark, striped throat, and *Williamsii*, the flowers have a reddish-brown throat.

A. violacea, flowers are reddish-purple.

ARISTOLOCHIA (*Birth-wort*)

Strong-growing climbing plants with heart-shaped leaves and bent, oddly-shaped flowers.

Time of flowering. Summer.

Propagation.

(1) Cuttings in February in a temperature of 75 deg. F.

(2) Seeds sown in March in a similar temperature.

Position. Pots or borders with the shoots trained close to the roof.

Temperature. March to September, 70 deg. to 80 deg. F.
September to March, 60 deg. to 65 deg. F.

General management. Re-pot in March. Water freely in summer, but give very little in winter.

Pruning. Cut back straggling shoots only.

Species cultivated.

A. brasiliensis, 15 to 20 ft. high with purple flowers.

A. gigas (*Syn. A. grandiflora*), 8 to 10 ft. high with purple flowers.

A. elegans (*Calico Flower*), 8 to 10 ft. high with green, white and red flowers.

A. fimbriata, flowers greenish-brown, purplish and yellow.

A. gigantea (*Syn. A. grandiflora var. Hookeri*), flowers yellowish-green and purple.

A. kewensis, greenish-yellow.

A. Sturtevantii is another variety of *A. grandiflora*.

CAMPSIS, formerly called BIGNONIA

(*Cross-Vine, Trumpet-Flower*)

Deciduous strong-growing climbers with fairly large flowers.

Time of flowering. Spring, summer and autumn.

Propagation.

(1) Cuttings of young shoots 3 ins. long in April in a temperature of 65 deg. to 70 deg. F.

(2) Layering young shoots at the end of the summer.

Position. Well-drained pots or borders in the sun.

Temperature. March to October, 55 deg. to 65 deg. F.
October to March, 45 deg. to 55 deg. F.

General management. Pot or plant firmly in February or March. Water freely in spring and summer, but very little at other times. Syringe once a day in hot, dry weather.

Pruning. Cut away weak growths as they appear, and shorten the remaining shoots in January.

Species cultivated.

B. capreolata, 12 to 15 ft. high with scarlet flowers in summer.

B. speciosa, 15 to 20 ft. high with lavender flowers in spring.

B. jasminoides (*Syn. Tecoma jasminoides*), 10 to 20 ft. with white and red flowers in August.

B. radicans (*Syn. Tecoma radicans*), scarlet and orange flowers in August and September.

BOUGAINVILLEA

Deciduous climbers with small, greenish inconspicuous flowers, but with brightly-coloured bracts. Suitable for training up walls or pillars or over wire frames.

Time of flowering. Summer and autumn.

Propagation. Heel cuttings of young shoots 3 ins. long from March to May in a temperature of 70 deg. to 80 deg. F.

Position. Well-drained pots or borders.

Temperature. February to May, 55 deg. to 60 deg. F.

May to September, 65 deg. to 75 deg. F.

September to February, 50 deg. to 55 deg. F.

Feeding. Feed well-rooted plants occasionally during the growing season.

General management. Pot, plant or top-dress in February. Water copiously in spring and summer, moderately in autumn, none in winter.

Pruning. Cut back shoots of the previous year's growth to within 1 in. of their base in February.

Species cultivated.

B. glabra, 5 to 8 ft. high with rose-coloured bracts.

The varieties *Sanderiana* and *Cypheri* are rich rose, while Orange King is bright orange-yellow.

B. spectabilis (*Syn. B. speciosa*) is a lilac-rose.

CLEMATIS

One species is suitable for culture in the greenhouse. The flowers are white.

Time of flowering. April.

Propagation.

(1) Cuttings in spring in a temperature of 75 deg. F.

(2) Seeds sown in spring in heat.

Position. Pots or well-drained beds.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Pot or plant in spring. Water

freely in summer moderately at other times. Syringe once a day in summer.

Pruning. Cut out weak growths and shorten strong ones a little in February.

Species cultivated.

C. indivisa.

CLERODENDRON (*Glory-Tree*)

Stove climber with heart-shaped leaves and fairly large flowers.

Time of flowering. Summer.

Propagation.

(1) Cuttings of shoots 3 ins. long from January to March in a temperature of 70 deg. to 75 deg. F.

(2) Seeds sown in March in a temperature of 75 deg. F.

Position. Pots or beds.

Temperature. February to October, 65 deg. to 85 deg. F.
October to February, 55 deg. to 60 deg. F.

General management. Pot or plant in February. Water freely in spring and summer, moderately in autumn and keep dry in winter.

Pruning. Cut back shoots after flowering to within 2 or 3 ins. of their base.

Species cultivated.

C. fallax, 2 to 4 ft. high with scarlet flowers.

C. fragrans, 6 ft. high with white or pink flowers.

C. speciosum, 10 ft. high with dull red flowers.

C. splendens, 10 ft. high with scarlet flowers.

C. Thomsoniae (*Syn. C. Balfourii*), 6 ft. high with crimson flowers.

CLIANTHUS (*Parrot's Bill, Sturt's Desert Pea*)

Climbers with richly-coloured pea-shaped flowers.

Time of flowering. April and May.

Propagation.

(1) Cuttings of shoots in March or April in a temperature of 75 deg. to 85 deg. F.

(2) Seeds sown in March in a temperature of 75 deg. F.

Position. Well-drained pots or beds, with the shoots trained up walls or pillars.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 45 deg. to 50 deg. F.

General management. Pot or plant in March. The plants dislike frequent disturbance. Water freely in spring and summer, moderately at other times. Syringe once a day in summer.

Pruning. Shorten young shoots to within 2 ins. of their base.

Species cultivated.

C. puniceus, 6 ft. high with crimson flowers.

COBEA (*Cup and Saucer Plant, Mexican Ivy*)

An easily-grown climber with large bell-shaped purplish flowers.

Time of flowering. Summer.

Propagation. Seeds sown in March in a temperature of 75 deg. F.

Position. Pots or beds.

Temperature. March to September, 60 deg. to 70 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Pot or plant in March. Water freely in summer, moderately at other times.

Pruning. Cut hard back in February.

Species cultivated.

C. scandens.

DIPLADENIA

Stove evergreen climbers with large funnel-shaped flowers.

Time of flowering. Summer.

Propagation. Cuttings of young side-shoots 3 ins. long from February to April in a temperature of 80 deg. F.

Position. Well-drained pots with the shoots trained near the roof.

Temperature. February to October, 65 deg. to 75 deg. F.

October to February, 55 deg. to 60 deg. F.

General management. Pot in February or March. Water freely in summer, moderately in spring and sparingly for the rest of the year.

Pruning. Cut back shoots which have flowered in October.

Species cultivated.

D. atropurpurea, 10 ft. high with purple flowers.

D. boliviensis, 8 to 10 ft. high with white and yellow flowers.

D. Sanderi, 10 ft. high with rose-coloured flowers.

Amabilis (rosy-crimson), and *brearleyana* (crimson), are varieties of *D. splendens*.

GLORIOSA (*Malabar Glory Lily, Mozambique Lily*)

Deciduous, tuberous-rooted climbers. The leaves are prolonged into tendrils and the red and yellow flowers are lily-like.

Time of flowering. Summer.

Propagation.

(1) Offsets at potting time.

(2) Seeds sown $\frac{1}{4}$ in. deep in February or March in a temperature of 75 deg. F.

Position. Well-drained pots with the shoots trained near the roof.

Temperature. February to September, 70 deg. to 85 deg. F.

September to February, 55 deg. to 65 deg. F.

General management. Pot up the tubers 2 ins. deep in February. Water moderately until plants are growing strongly, then freely. After flowering, water sparingly and then keep dry until potting time.

Species cultivated.

G. superba, 6 to 10 ft. high with orange and red flowers.

G. rothschildiana, ruby-red and yellow.

G. virescens, 5 ft. high with yellow and red flowers.

There is also a variety *grandiflora*.

HIBBERTIA

Slender evergreen climbers with small, heath-like leaves and fairly large yellow flowers.

Time of flowering. Summer.

Propagation. Cuttings of fairly firm shoots 3 ins. long from April to August, under a bell-glass in a temperature of 55 deg. to 65 deg. F.

Position. Pots, tubs or beds with the shoots tied up the rafters.

Temperature. March to October, 55 deg. to 75 deg. F.

October to March, 45 deg. to 55 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times.

Pruning. Cut back straggling shoots in February.

Species cultivated.

H. dentata.

H. volubilis.

HOYA (*Honey-plant, Wax Flower*)

Evergreen climbers, with thick leaves and wheel-shaped flowers in clusters.

Time of flowering. Summer.

Propagation.

(1) Cuttings of shoots of the previous year's growth from March to May in a temperature of 75 deg. to 85 deg. F.

(2) Layering shoots in spring or summer.

Position. Well-drained pots, beds or hanging baskets with shoots trained up against the walls, but fully exposed to light.

Temperature.

Stove Species: March to October, 65 deg. to 75 deg. F.

October to March, 55 deg. to 65 deg. F.

Greenhouse Species:

March to September, 55 deg. to 65 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times.

Pruning. Cut back into shape in February.

Species cultivated.*Stove Species :*

H. bella, 3 ft. high, with white and crimson flowers.

Greenhouse species :

H. carnosa, 10 to 12 ft. high, with pink or white flowers.

IPOMAEA

(*American Bell-bind, Moon Creeper, Morning Glory*)

Climbers with Convolvulus-like flowers, useful for clothing pillars.

Time of flowering. Summer or winter.

Propagation.

(1) Cuttings of side-shoots from March to August in temperature of 75 deg. to 85 deg. F.

(2) Seeds sown in March or April in a temperature of 60 deg. F.

Position. Pots, beds or borders with the shoots trained near the roof.

Temperature. March to September, 65 deg. to 75 deg. F.
September to March, 55 deg. to 65 deg. F.

General management. Pot or plant from February to April. Water freely in spring and summer, moderately at other times.

Pruning. Cut back straggly growths into shape in February.

Species cultivated.

I. Horsfalliae, 10 to 15 ft. high with pink flowers in winter.

I. Learii, 10 ft. high with blue flowers in summer.

I. rubrocaerulea, red.

JASMINUM (*Jasmine, Jessamine*)

The species suitable for greenhouse cultivation are almost evergreen and more or less climbing in habit, so are easily trained up against a wall.

Time of flowering. Autumn and winter.

Propagation.

- (1) Cuttings of firm shoots from March to September under a bell-glass in a temperature of 65 deg. to 75 deg. F.
- (2) Heel cuttings of young shoots in spring under a bell-glass in a temperature of 60 deg. F.

Position. Well-drained pots or borders with the shoots trained up near the roof.

Temperature.

Stove species : March to September, 65 deg. to 75 deg. F.
September to March, 55 deg. to 65 deg. F.

Greenhouse species :

March to September, 55 deg. to 65 deg. F.
September to March, 45 deg. to 55 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day in spring and summer.

Pruning. Cut back lightly in February.

Species cultivated.

Stove species :

J. gracillimum, 4 ft. high, with white flowers in winter.

J. Sambac, 6 ft. high, with flowers in autumn.

Greenhouse species :

J. grandiflorum, 10 ft high, with white flowers in autumn.

J. primulinum, 6 to 10 ft. high, with white flowers in winter.

J. revolutum, 9 to 12 ft. high with yellow flowers from June to August.

J. azoricum, white.

LAPAGERIA

These evergreens are among the most beautiful of greenhouse climbers.

Time of flowering. Summer.

Propagation.

- (1) Layering strong shoots in spring or autumn.
- (2) Seeds sown in March or April in a temperature of 55 deg. to 65 deg. F.

Position. Well-drained pots, tubs or beds in the shade.

Temperature. March to October, 55 deg. to 65 deg. F.

October to March, 40 deg. to 50 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day from March until the flowers develop. Ventilate freely in spring and summer.

Pruning. Cut out dead or weak shoots in March.

Species cultivated.

L. rosea, 15 to 20 ft. with pink flowers. The variety *albiflora* (or *alba*) has white flowers.

MANDEVILLA (*Chile Jasmine*)

Only one species is grown. This is a deciduous climber bearing numbers of large, white, sweetly-scented flowers.

Time of flowering. Summer.

Propagation.

(1) Cuttings of firm side-shoots 2 to 3 ins. long, in April or May in a temperature of 70 deg. to 85 deg. F.

(2) Seeds sown from February to April in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained beds where the shoots can be trained up near the roof to receive plenty of light and air.

Temperature. February to September, 55 deg. to 65 deg. F.

September to December, 45 deg. to 55 deg. F.

December to February, 40 deg. to 50 deg. F.

General management. Plant in February. Water freely in spring and summer, moderately in autumn and keep dry in winter. Syringe twice a day from February to July.

Pruning. Cut back weak shoots closely during the winter.

Species cultivated.

M. suaveolens.

MANETTIA

Evergreen twining climber with small tubular scarlet and orange flowers.

Time of flowering. March to December.

Propagation.

- (1) Cuttings of young shoots 2 to 3 ins. long in summer in a temperature of 65 deg. to 75 deg. F.
- (2) Seeds sown in February or March in a temperature of 55 deg. to 65 deg. F.

Position. Well-drained pots or beds with the shoots trained up near the roof.

Temperature. February to October, 55 deg. to 65 deg. F.
October to February, 45 deg. to 55 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day from March to September.

Pruning. Cut back lightly after flowering.

Species cultivated.

M. luteo-rubra (Syn. *M. bicolor*).

MITRARIA (*Mitre Flower, Scarlet Mitre-pod*)

There is only one species, a half-hardy evergreen climber with bright scarlet flowers.

Time of flowering. May to August.

Propagation.

- (1) Cuttings of shoots from April to September in a cold frame or under a bell-glass.
- (2) Division of the roots in April.

Position. Well-drained pots in the shade.

Temperature. 45 deg. to 50 deg. F.

General management. Pot in September for October or March. Water freely in spring and summer, moderately in autumn, sparingly in winter.

Pruning. Cut back the shoots slightly in autumn.

Species cultivated.

M. coccinea.

MONSTERA

Evergreen climber with yellow flowers, ornamental large, thick, dark green leaves perforated with large holes and cylindrical edible fruits. These are fragrant and pineapple flavoured and ripe in the autumn.

Time of flowering. Summer.

Propagation. Cuttings of stems at any time in a temperature of 70 deg. to 80 deg. F.

Position. Well-drained border against a damp wall.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 55 deg. to 65 deg. F.

General management. Plant February to April. Water freely in spring and summer, moderately at other times. Syringe twice a day in spring and summer, once a day at other times.

Species cultivated.

M. deliciosa.

PASSIFLORA (*Passion Flower*)

Vigorous climbers suitable for covering walls, rafters and pillars. They have long spiral tendrils and sometimes edible fruits.

Time of flowering. Summer.

Propagation.

(1) Cuttings of young shoots 4 to 6 ins. long from April to September in a temperature of 65 deg. F.

(2) Seeds sown $\frac{1}{4}$ in. deep at any time in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots, tubs or beds with the shoots trained near the glass in the sun.

Temperature.

Stove species : March to October, 65 deg. to 75 deg. F.

October to March, 55 deg. to 65 deg. F.

Greenhouse species :

March to October, 55 deg. to 65 deg. F.

October to March, 45 deg. to 50 deg. F.

Feeding. Feed plants occasionally when in flower.

General management. Re-pot or plant in February or March. Water copiously in spring and summer, moderately at other times. Syringe twice a day in spring and summer.

Pruning. To prevent overcrowding remove some of the weak shoots as they appear. In February cut out weak shoots and shorten back strong ones.

Species cultivated.

Stove species :

P. edulis, the Purple Granadilla, flowers white and purple.

P. quadrangularis, the Giant Granadilla, flowers fragrant and coloured red, violet and white.

P. racemosa (*Syn. P. princeps*), flowers red, white and purple.

Greenhouse species :

P. Belottii, flowers pink and blue.

P. caerulea, flowers white, blue and purple. The variety Constance Elliot is white.

PETREA (*Purple Wreath*)

A deciduous climber, with rough, leathery leaves and blue flowers in long racemes.

Time of flowering. Summer.

Propagation. Cuttings of firm young shoots in spring and summer under a bell-glass in a temperature of 65 to 75 deg. F.

Position. Well-drained pots or beds with the shoots trained up the rafters in the shade.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day in spring and summer.

Pruning. Cut back lightly in February.

Species cultivated.

P. volubilis.

PLUMBAGO (*Cape Leadwort*)

A shrubby climber, usually deciduous so that it does not shade other plants in the winter.

Time of flowering. Summer or winter.

Propagation.

(1) Heel cuttings of side-shoots 2 to 3 ins. long from February to August in a temperature of 60 deg. to 70 deg. F.

- (2) Seeds sown in February or March in a temperature of 65 deg. to 75 deg. F.

Position. Pots or borders with the shoots trained near the glass in a light part of the house, but shaded from strong sunlight.

Temperature.

Stove species : March to October, 75 deg. to 85 deg. F.
October to March, 55 deg. to 65 deg. F.

Greenhouse species :

March to October, 55 deg. to 65 deg. F.
October to March, 45 deg. to 55 deg. F.

Feeding. Feed twice a week during the flowering period.

General management. Pot or plant from February to April. Water freely in spring and summer, moderately at other times. Syringe once a day until the flowers start to appear.

Pruning. Cut back stove species moderately in January. Cut back shoots of greenhouse species to within 9 ins. of their base immediately after flowering.

Species cultivated.

Stove species :

P. rosea, 2 ft. high with purplish-red flowers in winter.
The variety *coccinea* is scarlet.

Greenhouse species :

P. capensis, 10 to 15 ft. high, with blue flowers in summer.
The variety *alba* is white.

RHODOCHITON

Only one species which is suitable for the greenhouse but not recommended for small houses. It is a climber with reddish-purple flowers.

Time of flowering. Summer.

Propagation.

- (1) Cuttings of shoots from March to August under a bell-glass in a temperature of 45 deg. F.
(2) Seeds sown in March in a temperature of 50 deg. to 60 deg. F.

Position. Well-drained pots, boxes or beds with the shoots trained up near the glass, but shaded from bright sun.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 45 deg. to 55 deg. F.

Feeding. Feed once a week during the flowering period.

General management. Pot or plant from March to May. Water freely in spring and summer, moderately at other times. The main shoots should be tied up, allowing the slender side-growths to hang down, thus giving a graceful effect.

Pruning. Thin out and shorten shoots lightly in February.

Species cultivated.

R. volubile (*Syn. Lophospermum atrosanguineum*), 10 to 15 ft. high.

RHYNCHOSPERMUM (*Chinese Jasmine*)

An easily grown evergreen climber, growing 10 to 15 ft. high with small trusses of very fragrant white flowers.

Time of flowering. Summer.

Propagation. Cuttings of firm young shoots 2 to 3 ins. long in spring or summer, under a bell-glass in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots or borders with the shoots trained up the walls or pillars but shaded from the sun.

Temperature. 45 deg. to 50 deg. F.

General management. Pot or plant in April or May. Water freely in spring and summer, moderately at other times. Syringe once a day in summer.

Pruning. Thin and cut back into shape after flowering.

Species cultivated.

R. jasminoides (*Syn. Trachelospermum jasminoides*).
There is also a variety *variegatum*.

SOLANUM

Climbers with decorative flowers.

Time of flowering. Summer.

Propagation. Cuttings of young shoots in late spring and early summer in gentle bottom heat.

Position. Pots, tubs or beds with the shoots trained up the rafters.

Temperature. March to September, 65 deg. to 75 deg. F.

September to March, 45 deg. to 55 deg. F.

General management. Pot or plant firmly in March. Water freely in spring and summer, moderately at other times.

Pruning. Cut away weak growths and shorten others in February.

Species cultivated.

S. jasminoides (Jasmine Nightshade), flowers blue and white.

S. seaforthianum, flowers blue or purple.

S. Wendlandii, flowers lilac and blue.

SOLLYA (*Australian Bluebell Creeper*)

Evergreen twiners which flower freely, producing deep blue flowers.

Time of flowering. Spring and summer.

Propagation. Cuttings of young shoots in spring and summer under a bell-glass in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots or beds with the shoots trained up against the walls or rafters.

Temperature. March to September, 55 deg. to 65 deg. F.

September to March, 40 deg. to 50 deg. F.

General management. Pot or plant in February or March. Water freely in spring and summer, moderately at other times. Syringe daily in summer.

Species cultivated.

S. heterophylla, 4 to 6 ft. high.

S. parviflora (*Syn. S. Drummondii*), 4 to 6 ft. high.

STEPHANOTIS

(*Clustered Wax-flower, Madagascar Jasmine*)

Stove evergreen twining shrubs with white fragrant flowers.

Time of flowering. Spring and summer.

Propagation. Cuttings of shoots of the previous year's

growth in spring under a bell-glass in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots, tubs or beds with the shoots trained up the rafters, but shaded from the sun.

Temperature. March to October, 70 deg. to 85 deg. F.

October to March, 45 deg. to 55 deg. F.

Feeding. Feed once a week between May and September.

General management. Pot or plant in February or March. Water copiously in spring and summer, moderately at other times. Syringe daily in spring and summer, except when the plants are in bloom.

Pruning. Cut back straggling shoots moderately closely and thin out weak shoots in January or February.

Species cultivated.

S. floribunda, the variety *Elvastoni* is dwarfer and more free-flowering.

STIGMAPHYLLON (*Golden Vine*)

A stove evergreen climber with clusters of showy yellow flowers.

Time of flowering. June to September.

Propagation. Cuttings of firm shoots in spring or summer, under a bell-glass in a temperature of 65 deg. to 75 deg. F.

Position. Well-drained pots with the shoots trained up the roof.

Temperature. March to September, 70 deg. to 85 deg. F.

September to March, 55 deg. to 65 deg. F.

General management. Pot in February or March. Water freely in spring and summer, moderately at other times. Syringe once a day during the summer.

Pruning. Cut away weak growths and shorten strong shoots moderately in January.

Species cultivated.

S. ciliatum, 8 to 10 ft. high.

STREPTOSOLEN

A free-flowering evergreen climber with clusters of bright orange flowers. Excellent for clothing a back wall.

Time of flowering. April to July.

Propagation. Cuttings of young shoots in spring or summer in a temperature of 55 deg. to 65 deg. F.

Position. Well-drained pots close to the glass, but shaded from strong sunlight.

Temperature. March to October, 60 deg. to 70 deg. F.

October to March, 45 deg. to 55 deg. F.

Feeding. Feed occasionally during the summer.

General management. Pot February to April. Water freely in spring and summer, moderately at other times. Syringe once a day in spring until the flowers appear. Give plenty of ventilation in spring and summer.

Pruning. Cut shoots back fairly closely after flowering.

Species cultivated.

S. Jamesonii, 4 to 6 ft. high.

TACSONIA (*Blood-red Passion Flower*)

Attractive plants closely related to the Passion flower. They are vigorous evergreen climbers so are most suitable for fairly large greenhouses.

Time of flowering. Summer and autumn.

(Propagation and cultivation as for *Passiflora*).

Species cultivated.

T. exoniensis, flowers red and pink in summer.

T. Van Volxemii, crimson flowers in the autumn.

THUNBERGIA (*Clock Vine*)

Evergreen climbers with funnel-shaped flowers.

Time of flowering. Spring and summer.

Propagation.

(1) Cuttings of firm young shoots 2 to 3 ins. long from February to June in a temperature of 75 deg. to 85 deg. F.

(2) Seeds sown from January to May in a similar temperature.

Position. Well-drained pots or beds with the shoots trained up the roof.

Temperature. February to October, 65 deg. to 75 deg. F.
October to February, 55 deg. to 65 deg. F.

Feeding. Feed occasionally from May to September.

General management. Pot in February or March.
Water freely in spring and summer, moderately in autumn and keep almost dry during the winter. Syringe once a day in spring and summer.

Pruning. Cut back lightly in February.

Species cultivated.

T. fragrans, 8 to 10 ft. high with white fragrant flowers in summer.

T. grandiflora, 10 to 15 ft. high with blue flowers from July to September.

T. Harrisii (*Syn. T. laurifolia*), 10 to 15 ft. high with white and light blue flowers from July to September.

T. mysorensis (*Syn. Hexacentris mysorensis*), 10 to 15 ft. high with yellow and purple flowers in spring.

CHAPTER XV

CACTI AND SUCCULENTS

Cacti are difficult, aren't they? No, if you

1. Water properly.
2. Use the right compost.
3. See to the temperatures.
4. Grow the best plants.
5. Learn about succulents.

CACTI and succulents attract people because of their quaintness. They are not difficult to grow, and many of them flower annually. There is no need to fear them (as so many people do) because of possible poisoning, for they are no more dangerous than roses. Some of the *Opuntias* have minute bristles, which may set up a skin irritation if handled carelessly, but this is soon cured by the use of thick ointment.

Succulents often appeal in preference to Cacti, for they have no spines. They will also grow in a less sunny position. Their foliage is varied and beautiful, and they have fat, juicy green leaves.

There are at least 2,000 different kinds of cacti, and they fall into three big groups. Within these groups there are 124 genera in all. The generic name of the plant may be said to be its surname, and the species name or specific name its Christian name.

It is best to label each plant with a small white celluloid label, and to write on it the generic and specific name with indelible ink in small capital letters. Those who are really keen on cacti often number the back of the label so that they can quickly refer to notes they have made in a loose-leaf notebook.

Cacti flowers may be yellow, scarlet, pink, magenta, orange or white. The white ones usually flower at night, and are generally sweetly scented. Some flowers last for several days, and others only for a few hours.

on. It should then be possible to grow the plants on in a temperature of 65 deg. F.

Some cacti can be propagated by means of cuttings. Side branches may be cut off during the growing season, and providing the cut is a clean one the cutting left to dry for a day or so, it may be struck in a mixture of equal parts of fine horticultural peat and pure silver sand. The pot in which the cutting is placed should contain plenty of drainage material at the bottom. Providing the compost is slightly damp, the compost may be placed in the shade and given no water for ten days. It is possible to strike a number of cuttings in the same pot or box, the best months for doing this being June and July.

Offshoots may be removed in the case of some cacti.

This is a necessary operation in the case where the offshoots grow out at various angles to the middle segment of the plant, and improves the parent plant.

It isn't necessary to remove offshoots (unless they are needed for propagation) where they spring from the base of the plant.

Cacti may also be propagated by grafting; if the top is cut off an *Opuntia* for instance another cactus may be grafted on if the surface area of the cuts is of a similar size. The two are merely pressed together and tied down, and union will soon take place.

It is also possible to graft by the wedge method.

Varieties. There are such a large number of cacti to choose from that it is very difficult to make a small selection. As it is, however, imperative in a book of this character, I have chosen those which grow easily, and which are very attractive.

CEREUS

C. azureus. Looks like a slender column. Has six ribs and short spines. Young plants have a bluish appearance.

C. flagelliformis. Commonly known as the Rat's Tail. Has spiny, slender stems, and beautiful 3-in. long bright magenta flowers. Should be grown suspended from the roof.

C. senilis. Known as the Old Man Cactus. A very popular type. Covered with bristles, and the seedlings are very attractive.

ECHINOCACTUS

E. bicolor. Has a large number of spines, and is oval in shape, though it is apt to vary in form and colours. The flowers are to be found even on quite young plants and are large and violet-purple in colour.

E. Leninghausii. This is a very beautiful type, and may become columnar. The plant is covered with bright yellow spines, and there are numbers of ribs. It bears yellow flowers which last quite well.

E. minusculus. This is a small green plant and has low spiral tubercles. Can be produced from seed, and bears scarlet flowers after about two years.

E. myriostigma. Known as the Bishop's Cap. May have four, five or six ribs, but no spines. It is covered with small white flecks, bears (from the centre) large pale yellow flowers.

ECHINOCEREUS

E. De Laetii. Similar to *C. senilis*, and may be known by the name of Old Man, too. Is apt to branch from the base.

E. chloranthus. Bears small yellowish flowers, the plant being covered with spines and oval in shape.

E. dasyacanthus. Cylindrical in shape, bearing reddish grey spines, large yellow flowers.

E. stramineus. Grows in groups, and the plants are egg-shaped. Straw-coloured spines and purple flowers.

ECHINOPSIS

E. aurea. Small plant bearing yellow flowers, and spherical in shape.

E. Eyriesii. Bears large white flowers with long tubes, Has been much hybridized.

MAMMILLARIA

M. bombycina. Is round or cylindrical, and has a woolly crown. Has small carmine flowers and white fruit, and the spines are white also, though the central ones are reddish.

M. elegans. Also cylindrical. The tubercles are spirally

arranged, and bear stars of small spines. Carmine flowers borne in a ring.

M. gracilis. Also known as *M. fragilis*. Has short white spines which are easily broken. Plant itself shaped like a club.

M. plumosa. Small plant with soft spines, giving a feathery effect. Very attractive.

M. Schelhasel. Dark green branching type. Inner spines hooked and outer ones soft. Yellow flowers with red stripe.

M. Wildii. Small and elongated, dark green. Small flowers, white and quite abundant. Has thin spines.

OPUNTIA

O. Bergeriana. Tall plant which has long spines and green leaves.

O. leptocaulis. Has cylindrical stem and long spines.

O. ursina. Commonly known as Grizzly Bear because it has long grey hairs.

PHYLLOCACTUS

P. anguliger. Has dark green branches, and angled edges, large white, scented flowers.

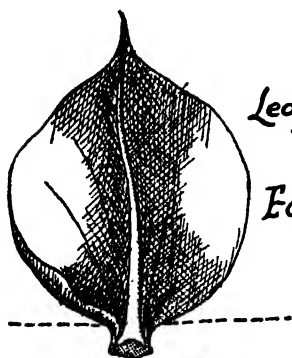
P. cartagense. Long thin branches, sweetly scented white flowers which open at night.

P. phyllanthus. Leaf-like branches, light green in colour, and greenish flowers.

P. stenopetalum. Narrow branches and white flowers.

SUCCULENTS

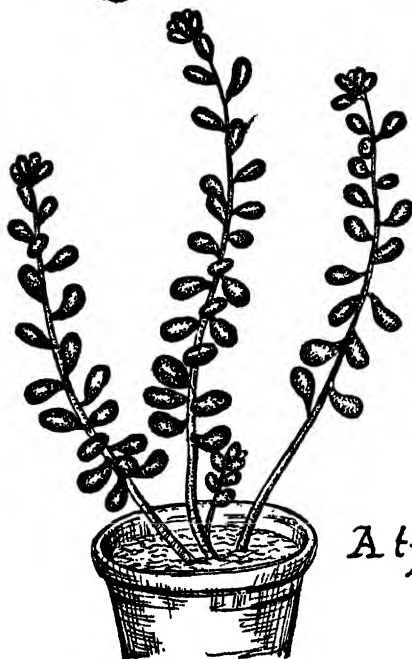
All cacti are succulents, but all succulents are not cacti. Amateurs find it easy to recognize the difference between the two of them except perhaps in the case of *Euphorbias* which have spines and thorns. The succulents store moisture in their foliage or stems and in some cases in their roots. This enables them to overcome long periods of drought. There are hundreds of succulents, and only a short list is given as a guide.

CACTI and SUCCULENTS-PROPAGATIONS

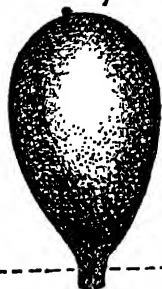
Leaf Cutting
of
Echeveria



Cutting of
Stapelia variegata



A typical
Sedum.



Cutting of *Sedum*

AGAVE

Usually live for a great number of years before producing their flower stalk and then die after throwing up numerous offsets.

A. filifera. A small plant with greyish-green leaves covered with white stripes, white fibres hang from the leaves.

A. stricta. Bears rosettes of slender round greyish-green foliage.

A. Victoriae-reginae. Leaves are dark green, shiny with white stripes.

ALOE

Very similar to the *Agave*, but the flowering stalk is produced at the side of the rosette. The plant continues to live after flowering.

A. arborescens. Has long, toothed foliage.

A. ciliaris. A semi-climber with small green foliage.

A. distans. Rather tall plant with shortish dark foliage.

A. humilis. A small growing plant with greyish-green leaves, slightly toothed.

A. variegata. An attractive plant known as the Partridge Breasted Aloe.

CRASSULA

All the members of this group have star-shaped flowers, all of them small.

C. bolusii. Small greyish foliage, covered with brown spots. Bears white flowers.

C. corollina. Has baby foliage, covered with crystal spots.

C. cultrata. The leaves are tipped with red, the plants are branching, short and dark green.

C. gillii. Leaves are borne in flat dark rosettes. The flowers are white, being borne on long stems. They last for several weeks.

C. multica. The round leaves become a bright red if the plant is starved. Pinkish flowers are produced late in winter.

C. pyramidalis. The leaves are dark green and tightly packed, and seem to form little four-sided columns.

ECHEVERIA

The true *Echeveria* bear short bell-shaped flowers, the leaves being generally broad.

E. amoena. The leaves borne in tiny rosettes, being a greyish colour and tinted with red.

E. retusa hybrids. The leaves borne in greyish-green rosettes, beautiful orange and yellow bell-like flowers produced on tall stems.

EUPHORBIA

All *Euphorbias* discharge a milky juice when punctured. The flowers are generally insignificant, the stems being column-like. Many have no leaves, and some are thorny.

E. cereiformis. Looks like a cactus, has straight thorns, is tall.

E. gorgonis. Has short branches and depressed crowns.

E. splendens. Very thorny, bears brilliant crimson flowers. Supposed to be the plant from which Our Lord's crown of thorns was made.

MESEMBRYANTHEMUM

Perhaps the best flowering group of succulents, and the largest. Very varied.

There are so many types to choose from, that I have not attempted to do so. Special note should, however, be made of the genus *Conophytum* where most of the plants look like little brown or green pebbles, and which rest in the summer and look dead. The genus *Didymaetus* looks like an inverted boat with a V-slice cut in the centre. The genus *Lithops* also looks like stones which have flat cleft tops. The genus *Rimaria* has pairs of leaves pressed together forming a semi-globose whitish-green body.

SEMPERVIVUM

There are large numbers of *Sempervivums*, many of which are sub-shrubby. In the genus *Monanthes* the plants are mostly very small with curious greenish-yellow star-like flowers.

Those who wish for further lists of cacti and succulents should consult books and catalogues on this subject.

JAPANESE :

Birmingham, crimson with gold reverse.
Henry E. Trueman, white.
Julia, rosy-bronze.
Majestic, golden amber.
Mrs. Alg. Davis, pink.
Mrs. R. C. Pulling, ochre-yellow.
Red Majestic, deep rich terra-cotta.
Thos. W. Pockett, pink with silver reverse.
W. Rigby, deep yellow.

POMPOMS :

Ball of Gold, bright yellow.
Ethel, bright red.
Hilda Canning, bronze.
Snowdrop, white.
Thanksgiving Gem, deep bronze.
Thyria, deep pink.

QUILLED VARIETIES :

Rayonnante, pink.
White Rayonnante, white.

SINGLES :

Bronze Exmouth, bronze.
Catriona, rich rose-pink, with a narrow white zone round the yellow eye.
Cygnet, pure white.
Elliptis, wine-purple.
Godfrey's Gem, warm golden apricot.
Golden Seal, deep yellow.
Kirkland's Crimson, deep crimson with a yellow disc.
Margot Graham, terra-cotta with a yellow disc.
Mrs. H. Woolman, bright orange-yellow.
Susette, purplish-pink.
Tangerine, bright chestnut-scarlet.

CARNATIONS

Various kinds of carnations may be grown in glasshouses, the most popular being the Perpetual Flowering. They are really the only class that have any real value for winter blooming under glass. Malmaisons can be grown in a cool greenhouse as can the *Allwoodii*. The Perpetual Malmaisons flower all the year round and have a heavier scent. They cannot be forced, and require an airy house. The room carnation, a selected form of the perpetual flowering, has a short bushy

habit and makes an attractive pot plant. The Perpetual Border Carnation is a good cold greenhouse plant, though it is usually grown out of doors.

The Carnation House. Where a special greenhouse is to be devoted to carnations it should be situated where it can obtain plenty of sunlight. The hot flow pipes from the heating apparatus should if possible be placed near the roof to counteract the cold, and this is one of the best ways of keeping the air moving.

The house should have, if possible, side and end ventilators as well as top ventilators.

PERPETUAL FLOWERING CARNATIONS

Propagation. Most of the larger growers propagate their Perpetual Flowering Carnations by cuttings during the months of December, January and February. Cuttings should never be taken promiscuously from plants. They should be uniform and of an average size. It helps matters if the parent plants are grown in plenty of light, and are not fed to excess. The best cuttings will be found on the flowering growth where it is thickest, and where there is a short inter-node. The cutting will then be about 3 ins. long and should be removed with a gentle downward pull. A small portion of the bark should come away from the flower stems at the same time. This denotes that the cutting is in the right condition. The portion of bark should be cut off with the sharp blade of a knife. The tops of young plants should never be used as cuttings.

The cutting should be placed in clean sharp sand of a medium texture. This sand should be placed in a well-drained propagating pan or pot, which should be at least 4 ins. deep. This allows for a 3 in. depth of sand, $\frac{1}{2}$ in. depth of crock at the bottom and a space of $\frac{1}{2}$ in. at the top. If 5-in. pots are used there should be 2 ins. of good drainage at the bottom. Firm the sand down well and give a little watering to settle it in position. Dibble the cuttings in $\frac{1}{4}$ in. deep and $1\frac{1}{2}$ ins. apart. See that the base of the cutting is firmed. Give another watering and then plunge the pots or pans up to their rims in ashes. Shade them from the sun, give them plenty of light

and no draughts. It is best to place the cuttings in a propagating frame at the warmest end of the house, and hessian may be draped round the sides of the case in order to encourage bottom heat. The frames should be at least 12 ins. deep so as to allow the cuttings to be clear of the glass.

A few cuttings may be struck in a 12-in. pot well crocked and filled to within 5 ins. of the top with medium silver sand. This should be watered, the cuttings dibbled in, and a sheet of glass rested on top of the pot. The pot should then be stood over a hot water pipe so as to get bottom heat. The sheet of glass should be removed for 1½ hours early each morning until the cuttings have rooted when it may be removed altogether.

The dibber used should always be exactly the same size as the cutting and the bottom of the cutting must rest upon the sand.

First potting. Young cuttings should be removed carefully when they are well rooted so as to disturb them as little as possible. They should be potted up moderately firm into the John Innes potting compost (see page 52). A 2-in. pot should be used and providing it is clean and dry it need not be crocked. The cuttings should not be potted up deeper in the soil than they were in the sand, and after potting, the pots should be placed on ashes a little space being allowed between the pots. At this time they need plenty of light and air.

YOUNG CARNATIONS

Watering. A good watering should be given after potting with water at the same temperature as the house. No further water should be given except when the soil shows signs of getting dry. The young plants may be sprayed overhead on bright days—but regular dampings should not be given.

Shading. When the plants are very young they are inclined to wilt, and should be shaded. In four days the roots should have reached the sides of the pots and shading may then cease, except for the hottest hours of the day.

Temperature. The house should be kept at a temperature of 40 to 45 deg. F. at night-time and 45 to 50 deg. F. during the day.

Potting on. Never allow a young carnation to become pot bound. Pot it on into a 3-in. pot first of all and then into a 4½-in. pot. See that the pots are clean in all cases, and do not crock if the plants are to be stood on ashes. Take care not to bury the plant any deeper at each successive potting. Pot somewhat firmer each time. Always water well the day before each potting.

The final potting should be into 5 or 6-in. pots for March-rooted cuttings, and 7 or 8-in. pots for December or January-rooted cuttings. The plants should be stood on the bench in a light, airy, cool position.

GROWING THE MATURE PLANT

Perpetual flowering carnations intended for early winter flowering should be potted into the flowering pots by the end of June. They may then, if desired, be stood in a frame, well protected from rain.

Watering. The plants may be syringed once or twice a week during the summer. This not only freshens the leaves, but helps to keep down red spider. In hot weather, if in the house, the paths and staging should be kept damp too.

Water the plant *when* it requires it. Never allow the soil in the pot to be too wet or too dry. It is the perpetual sprinkling that does so much harm both when the plants are outside or under cover.

Supports. It is really better to give a wire support to each plant. These galvanized wire supports and rings may be bought from any sundriesman.

Housing. Like the chrysanthemum, the carnation needs housing, but much earlier. It is better to get them under cover early in August.

It is better that the flowering buds should be formed under glass.

GROWING THE SECOND YEAR

The blooms should be cut with long stalks during the winter and this keeps the plants short. This is better than hard pruning back afterwards.

In June the plants will need potting on from say a 7-in. pot into an 8-in. or from an 8-in. pot into a 10-in.

After a week or ten days they may be stood outside and be brought in again early in August.

Indoors always. Some gardeners prefer to keep their plants indoors all the summer. If this is done the greatest of care should be taken to keep down red spider, and it may be necessary to spray with a special red spider insecticide (see page 317) once a month. The atmosphere of the house should be kept moist during the hot sunny weather. It may be necessary, in the south, to give the house a light shading.

Winter care. During the dull days of the winter, care should be taken not to increase the heat, for a temperature increase without an increase of light is harmful. The ventilators should be opened whenever possible so as to keep the plants robust.

The carnation may be grown on the dry side during the winter, and it may be only necessary to give a good watering once a week. Each pot should be judged according to its dryness.

Watering should not be done on the dull rainy days because then leaf evaporation is slow. After the turn of the year the plants may flag on the first bright day, but this should not be taken necessarily as an indication of dryness.

Temperature. A little heat should be kept "on" the whole time, sufficient to keep the atmosphere buoyant. The healthiest growth will be produced with a night temperature of 45 deg. F. and a day temperature of from 50 to 55 deg. F., though with sun heat the house will often run up to 70 or 80 deg. F. without any ill-effects.

Ventilation. Air is absolutely essential, both at night and in the day-time. Draughts should be avoided at all costs, and the ventilators should only be closed to keep out frosts.

The best carnation houses are those which are large and lofty so that even in the severest weather a large body of air can be retained, and the buoyancy kept up.

Too little ventilation in the winter and too much heat will produce soft growth and split calyces.

General hints. A certain amount of shading is necessary when the stock is flowering. This may commence in the south about the third week of April and in the north about the second week in May. The shading can be quite light, and may be given with whitewash or one of the special horticultural shadings sold by the sundriesman.

Stopping. The end growth of the carnation is pinched out so as to induce it to throw side breaks. The first stopping should be done when there are eight good pairs of leaves.

The actual process of stopping consists of breaking the lead out with a side bend. This should be done early in the morning when the growth is brittle and stiff.

The growth stopped will not produce flowers until five months later. This means that in order to get winter blooming, July is sufficiently late to stop the Perpetual Carnation. The first stopping may be done in October and the second stopping in June. The plants should be looked over once or twice a week, and the growths that are ready for stopping should be pinched each time. This will help to ensure a succession of bloom.

Disbudding. The lateral buds should not be removed immediately they become visible, but should be allowed to develop somewhat. When they are of an easy size to handle and are growing away from the stems it is quite simple to pinch them out. Much better flowers are produced as a result.

MALMAISONS

These carnations are twice the size of the ordinary border carnations, and have a much stronger scent. They have only one flowering season and that is at the end of May through June.

They should be grown in a cool greenhouse and require as near "natural" conditions as possible.

Ventilation. Give ventilation at the side as well as at the top of the house all the time, and only close the ventilators in cases of severe frost.

Propagation. To be propagated by layering in a cold

frame, the pots being laid on their sides for this purpose. The start of the cut should be in the middle of an inter-node and right through one node up to the next. This cut should be kept open with a small piece of matchstick, and the layer buried in the sandy compost. Layers take a month or six weeks to root.

When rooted, sever from the parent plant a week before potting up.

Potting. Pot up into as small a pot as possible into the John Innes Potting Compost. By the autumn the plants should be in 5-in. pots. In early spring they may be potted on into the 7-in. pots in which they will flower.

Only one flower results in the first flowering year, but in the second year each young shoot produces a flower.

General remarks. Malmaisons require cool, dry airy conditions, and just a little shade from the hottest sun in the summer.

PERPETUAL MALMAISONS

These flower all the year round, and have a heavy scent. They cannot be forced. Like the ordinary Malmaisons they should be grown in an ordinary house with side, bottom and top ventilation.

Propagation. The best cuttings are heel cuttings, and all the trimming that is needed is the removal of the little bits of skin with the sharp blade of a knife. Nodal cuttings may be taken, but these require more heat. The cuttings should be chosen from mid-way up a plant as advised for the Perpetual Flowering. Do this in autumn or spring. The heat in the propagating frame need only be 5 deg. higher than the temperature they are grown in ordinarily. The compost for cuttings may consist of four parts good soil to one part of silver sand.

ALLWOODII

The Allwoodii may be grown in pots in the cold greenhouse exactly in the same way as the Perpetual Carnation. They will bloom for nine months out of the twelve.

PERPETUAL BORDER

Are usually grown outside, but can be cultivated in a cold greenhouse. In this case they are best propagated in the autumn or spring from cuttings.

Special Note.

Composts. In each case the John Innes Potting Compost will answer well, and so may be used for all classes of carnations, both at the first potting and at the final potting.

Varieties

PERPETUAL FLOWERING :

Pink.

Ditchling, a cherry-cerise, good for cutting.

Scarlet.

Robert Allwood, vivid scarlet with large flowers.

Crimson.

Joyce Carnation, a very large crimson.

Heliotrope.

Doris Allwood, soft salmon-rose, shaded French grey, good perfume.

Yellow.

Allwood's Primrose, pure yellow self.

FANCY VARIETIES :

Dairy Maid, white ground, flaked pink near edge.

Pelargonium, white ground overlaid crimson-maroon.

Tangerine, flame-apricot self.

ROOM CARNATIONS :

Can be obtained in several varieties. They are known as **Rose Room**, **Apricot Room**, **Scarlet Room**, etc.

PERPETUAL MALMAISON :

Adriatic, large pure white, with good scent.

Delicata, very large delicate pink, veiled deeper shade.

Homeric, rich crimson-claret.

Olympic, good crimson.

BORDER CARNATIONS :

White.

Border White, pure white, good variety.

Pink.

Nautilus, soft salmon-rose.

Scarlet.

Montrose, vivid geranium-red.

CHRYSANTHEMUMS, CARNATIONS, ROSES 297

CLIMBING ROSES :

Maréchal Niel, a rich golden-yellow.
Climbing Ophelia, a salmon-flesh.
Climbing Niphetos, pure paper-white.
Gloire de Dijon, a buff with an orange centre.
Mermaid, a clear sulphur-yellow.
All these may be planted out.

RAMBLER ROSES :

American Pillar, deep pink with clear white eye.
Chaplin's Pink Climber, a semi-double pink.
Emily Gray, a golden-yellow.
Hiawatha, a brilliant scarlet.
Paul's Scarlet Climber, a vivid scarlet.
The New Dawn, a soft, delicate pink.

DWARF POLYANTHA ROSES :

Anne Poulsen, a bright crimson red.
Else Poulsen, a semi-double clear rose-pink.
Gloria Mundi, a scarlet-orange.
Karen Poulsen, a brilliant scarlet.
Orleans Rose, a rosy-red with peach centre.
Paul Crampel, an orange-scarlet.

CHAPTER XVII

EASY ORCHIDS

Not the most difficult plants to grow, because

1. They will put up with a mixed house.
2. No feeding has to be done.
3. Direct sunlight is not required.
4. There are resting periods.
5. There are easy species.

AMATEURS seem to have the idea that there are no such plants as easily-grown orchids. It is true that to grow orchids, especially the rare kinds, really well, it is essential to devote a whole house to them alone, since they require certain conditions of heat, moisture, etc., but there are several kinds which can be grown quite successfully in a mixed house.

The species and forms found in nature are not grown a great deal now, but there are numerous varieties and hybrids from which to choose. The group, as a whole, is so large and varied, that it will be possible to deal here with only a few of the most easily grown, such as *Cymbidiums*, *Cypripediums*, etc.

Temperature.

(1) **Cool house.** Suitable for *Cymbidiums*, *Odontoglossums* and some kinds of *Coelogynes*, *Cypripediums*, *Dendrobiums* and *Miltonias*.

In summer the night temperature should be kept as near 60 deg. F. as possible.

In winter the night temperature may fall to 50 deg. F. or even lower, but during the day should be increased to 55 deg. to 60 deg. F.

(2) **Intermediate house.** Suitable for some forms of *Cattleyas*, *Coelogynes*, *Cypripediums*, *Dendrobiums* and *Miltonias*.

In summer the temperature should be 65 deg. F. at night, and 65 deg. to 70 deg. F. during the day, or even higher on sunny days. The winter temperature should be 60 deg. to 65 deg. F. by day, and 55 deg. to 60 deg. F. at night.

(3) **Stove house.** Suitable for *Calanthes*, and some kinds of *Cattleyas*, *Coelogynes*, *Cypripediums* and *Dendrobiums*.

The summer temperature should be 70 deg. F. at night, and 70 deg. to 80 deg. F. by day, rising even higher during bright sunshine. In winter the night temperature should be 65 deg. F., and 70 deg. F. during the day.

The mixed house. When growing orchids with other plants it is essential that they have plenty of light and air and are not overshadowed by other foliage. Therefore, it is a good plan to set the pots on inverted flower-pots, especially in a warm house where foliage tends to be luxuriant. Syringing can then be done more easily in between the inverted pots which should be standing on ash or a gravel foundation.

Feeding. If manure water is poured on to the floor in a warm atmosphere it stimulates the growth of orchids by the ammonia vapour given off. Soot-water can also be used in this way and has proved beneficial. But no actual feed should ever be given to the pots.

Heating. Although hot water pipes are necessary for raising the temperature, the warmth of the sun should be used for this purpose as often as possible. It is an advantage, too, to have more area of piping than is really essential. This allows a pleasant warmth to be maintained without the pipes becoming too fiercely hot.

Ventilation. Nearly all orchids are natives of hilly districts and so enjoy plenty of fresh air, but draughts must always be avoided. Stove houses cannot be ventilated too freely, because of the danger of lowering the temperature, but the houses should be aired on all possible occasions:

Shading. Most orchids enjoy plenty of light but not direct sunlight. Blinds are, of course, the most suitable form of shading, and should be kept in position all through the year, so that they are always ready for sudden bursts of bright sunshine. Blinds made from wooden laths, which run up and

down the roof, are best, since they admit a little sunlight, but not enough to damage the plants. It is advisable to have a space between the glass and the blinds, as in this way a more even temperature is maintained. Blinds may also be used in winter at night to keep out frost.

If permanent shading is used it should be put on as late as possible, not till the end of March, or even later.

Watering. Rainwater should be used whenever possible and must always be at the same temperature as the house. As a general rule, plenty of water should be given when the plants are growing actively; at other times none, or very little, is necessary. If sphagnum moss is used on the surface, this should always be kept moist to remain green, a light "dewing over" only should be necessary during the winter and late autumn.

During the partial resting period very little water should be given to the plants, in fact only just sufficient to keep the leaves and pseudo bulbs plump. Any water that rests on the young growths should always be dried off with a soft brush.

Syringing. On the whole light sprayings only should be given early in the day, so that surplus moisture has time to disappear before evening. *Calanthes* should never be syringed until the leaves are mature, while *Cymbidiums* and *Cypripediums* enjoy fairly heavy syringing during hot weather. Soft water should always be used whenever possible.

Damping. Many orchids live in districts where the atmosphere is moist from vapour rising from the soil or leaves of plants. These conditions should be imitated as nearly as possible by damping down the floors and stagings. In summer this is often necessary three or four times a day, but in winter once is usually enough in the cool house and twice in the stove. Damping should always be done with a rising temperature.

Resting. Many orchids are obtained from districts where there is a definite rainy season when the plants grow vigorously, followed by a long dry season when growth cannot take place.

Many *Calanthes*, *Cattleyas* and *Dendrobiums* have well-

defined pseudo bulbs and need a definite rest in a lower temperature. Others such as *Cypripediums* and *Odontoglossums* only need a partial rest, and the soil should not be allowed to become dry.

Composts

(1) Three parts *Osmunda* fibre and 1 part sphagnum moss for *Cattleyas*, *Coelogynes* and *Dendrobiums*.

(2) Three parts *Osmunda* fibre, $\frac{1}{2}$ part sphagnum moss, $\frac{1}{2}$ part clean, dry oak or beech leaf mould and a little silver sand for *Miltonias* and *Odontoglossums*.

(3) Two parts *Osmunda* fibre, 1 part loam fibre and 2 parts sphagnum moss, for *Cypripediums* with mottled leaves.

(4) Three parts fibrous loam, 1 part *Osmunda* fibre and 1 part sphagnum moss for *Cypripediums* with green leaves.

(5) For *Cymbidiums* use compost (4) plus some finely-broken crocks.

(6) Four parts fairly fibrous loam, 1 part sand, leaf mould and finely-chopped sphagnum moss for deciduous *Calanthes*.

A little charcoal may be added to each compost.

The best way of firming the compost is by ramming it in between the roots by means of a small stick.

It is best to re-pot orchids as they go out of flower, as soon as new growth is seen coming from the base of the last made pseudo bulbs.

Potting. Potting should always be done just as root action starts, if possible, just before the roots actually appear. Annual potting is not necessary so long as the pots are large enough and the compost good.

Cypripediums are usually potted in late winter, and *Odontoglossums* in September or March. *Cattleyas* have two periods of active root growth, one early in the season when the new growths appear, the other later when the growths are becoming mature. Re-potting may be done at either period although the earlier one is to be preferred.

The pots must be well drained, with most of the crocks placed in an upright position.

Cattleyas and *Dendrobiums* should be potted very firmly ;

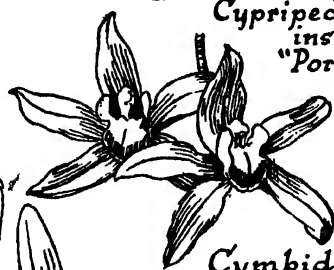
THREE DIFFERENT TYPES OF ORCHIDS



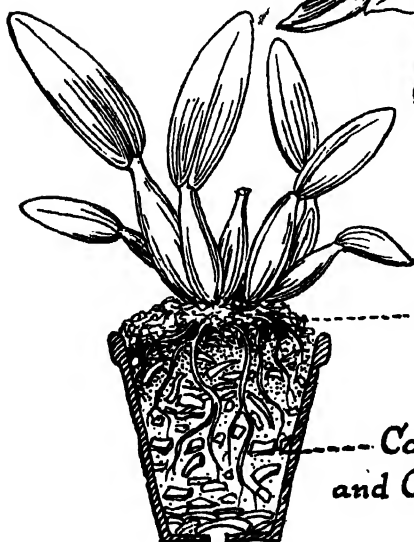
*Dendrobium
injundibulum*



*Cypripedium
insigne
"Portia"*



*Cymbidium
Woodmansianum*



*Sphagnum moss
mounded up*

*Compost of crocks
and Osmunda fibre*

Odontoglossums and other softer-growing plants more lightly. Dendrobiums do best in small pots.

Varieties

CALANTHES :

C. Regnierii is the only species much grown ; it grows 2 to 3 ft. high, and produces white and rose-pink flowers. These are easy of culture, so long as the watering season is given careful attention. As soon as new growths appear in the form of tiny buds at the base of the pseudo bulb, the soil around should be kept moist and gradually more water given as the bulbs develop. No syringing should be done then at all. It is possible, then, to feed with Clay's fertilizer or soot-water once a week. When the flower spikes develop, watering should gradually cease and the plants should be allowed to get quite dry when the flowers expand. They should be left dry till new growth appears again.

Hybrids include : **Baron Schroeder** (*Syn. gigas*), white and rose ; **Harrisii**, white ; **Veitchii**, pink ; and **Bryan and William Murray** are both pale pink varieties of *Darblayana*.

All flower in the winter.

CATTLEYSAS :

Several species are grown.

C. bowringiana, 12 ins. high with rosy-purple flowers in October.
C. gaskelliana, white rosy-purple and yellow flowers in late summer and autumn.

C. labiata, 1 ft. high with mauve-purple and yellow flowers in autumn.

C. Mendellii, rosy-lilac and purple flowers in April and May.

C. Mossiae, rose, crimson-purple and yellow flowers from May to July.

C. Schroderae, rose, purple and orange flowers in spring.

C. Skinneri, 10 ins. high with rose, purple and white flowers in May.

C. Trianae, with rosy-lilac, purple and orange flowers from January to May.

There are also many hybrids.

COELOGYNES :

Several species are cultivated, including :

C. cristata, 6 to 10 ins. high with white and yellow flowers from February to April.

C. dayana, 6 ins. high with yellow flowers in June.

C. massangeana, 1 ft. high with yellow and red flowers in June.

C. speciosa, 9 ins. high with yellow and brown flowers in autumn.

CYMBIDIUMS .

One or two species are cultivated, e.g. :

C. giganteum, with yellow, purple and crimson flowers in winter.

C. lowianum, with yellow, cream and maroon flowers in February and March.

C. traceyanum, with yellow and crimson flowers in winter.

There are also many fine hybrids and varieties, some of the least expensive being : **Gottianum**, **Pauwelsii** and **Swallow**.

CYPRIPEDIUMS :

Stove species :

C. bellatulum, white and purple flowers in May.

C. Charlesworthii, rose and white flowers in autumn.

C. Lawrenceanum, white and purple flowers in April.

C. niveum, white and rose flowers in spring.

Greenhouse species :

C. insigne, white, purple and brown flowers from December to February ; the variety *Sanderæ* is yellow. Quite easy to grow. There are also many varieties and hybrids.

DENDROBIUMS :

Several species are cultivated, including :

D. brymerianum, 17 ins. high with fragrant yellow and orange flowers in spring.

D. chrysanthum, 4 to 6 ft. high with yellow and purple flowers in winter.

D. chrysotoxum, 1 ft. high with yellow and orange flowers in March.

D. densiflorum, 18 ins. high with yellow and orange flowers in spring.

D. fimbriatum oculatum, 4 ft. high with orange-yellow and red flowers in March and April.

D. jamesianum, 18 ins. high with white and red flowers in May.

D. nobile, 2 ft. high with white, rosy-purple and crimson flowers in winter.

D. primulinum, 12 to 18 ins. high with rosy-lilac and yellow flowers in winter.

D. pulchellum (*Syn. D. dalhousianum*), 4 to 5 ft. high with yellow, rose and crimson flowers in spring.

D. speciosum, 12 ins. high with creamy-yellow and purple flowers in spring.

D. superbiens, 3 to 4 ft. high with magenta-pink and purple flowers in spring.

D. wardianum, 2 ft. high with white, purple and yellow flowers in winter.

There are numerous hybrids, including *D. Ainsworthii*, with white and crimson-purple flowers in spring.

MILTONIAS

M. vexillaria is the only species commonly cultivated. This is 18 ins. high with white, pink, yellow and orange flowers in spring. There are numerous hybrids and varieties.

ODONTOGLOSSUMS.

Several species are cultivated, including :

O. Cervantesii, 6 ins. high, with white and brown flowers in spring
O. citrosmum, 6 to 8 ins. high with fragrant white, rose and yellow flowers in May.

O. crispum (*Syn. O. Alexandrae*), 12 to 18 ins. high with white rose and crimson flowers in spring.

O. grande, 1 ft. high with yellow and red flowers in autumn.

O. nobile (*Syn. O. Pescatorei*), 1 to 2 ft. high with white, purple, yellow and red flowers in spring.

O. pulchellum, 1 ft. high with white fragrant flowers in winter.

There are also numerous hybrids

CHAPTER XVIII

MONTH BY MONTH IN THE GREENHOUSE

As this book gives details of the culture of a wide range of plants suitable for cool, intermediate and stove glasshouses, so these monthly notes cover the suitable operations for all these types of houses but the temperatures given are for the ordinary mixed greenhouse; those wishing to grow the more tender and exotic plants should add 10°-20° F. to the minimum night temperatures given.

JANUARY

General. Prepare composts and receptacles ready for sowing seeds and taking cuttings. Top-dress stove plants which do not need re-potting. Begin to force bulbs for flowering in March; also early-flowering shrubs such as Daphnes and Azaleas. Start standard Fuchsias in heat and bring in first batch of pot Roses for forcing. Sponge leaves of foliage plants. Remove decaying leaves and dead flowers. Pipes may be painted and glass cleaned if necessary.

Potting. Pot on seedlings and rooted cuttings as they need it. Re-pot and start into growth Achimenes, Begonias, Gloxinias and Hippeastrums. Re-pot or top-dress Cypripediums.

Propagation.

(a) *Seeds.* During the second half of the month sow seeds of Abutilon, Acacia, Annuals, Asparagus Fern, Balsams, Begonias, Cannas, Clerodendron, Coleus, Eucalyptus, Freesia, Fuchsia, Gloxinia, Grevillea, Leucocoryne, Pelargonium, Petunia, Saintpaulia, Solanum and Streptocarpus.

(b) *Vegetative.* Take cuttings of Carnations, Chrysanthemums, Coleus, Fuchsia, Heliotrope, Impatiens, Jacobinia, Lantana, Pelargonium, Salvia and Tradescantia.

Pruning. Prune pot Roses, Fuchsias, Bougainvillea, Passion Flowers, Plumbago and many of the climbers.

Temperature. In the ordinary greenhouse maintain a night temperature of 40 deg. to 45 deg. F. and a day one of 50 deg. to 55 deg. F.

Watering. Water sparingly, being careful not to wet the flowers of plants in bloom.

FEBRUARY

General. Introduce more bulbs and Roses into heat for forcing. Bring into warmer house Heliotrope and Hydrangeas. Start Gloriosas into growth. Prick out seedlings when large enough. Continue cleaning glass.

Potting. Re-pot or top-dress plants starting into growth, such as Fuchsias, Pelargoniums, Ferns and foliage plants. Pot on young plants as they need it. Pot up rooted cuttings, Lily bulbs, Gloxinias and Begonias. Re-pot Odontoglossums as they finish flowering. Re-pot Thunias and start into growth.

Propagation.

(a) *Seeds.* Sow seeds of Alonsoa, Annuals, Calceolarias, Carnations, Celosias, Celsias, Hippeastrums, Oxalis, Primulas, Salvias, Tecoma and Thunbergia.

(b) *Vegetative.* Take cuttings of Acalypha, Begonias, Bouvardias, Marguerites, Petunias, Pilea and Saintpaulia. Take leaf cuttings of Begonia Gloire de Lorraine.

Temperature. As for January.

Ventilation. Give some ventilation during the middle of bright, mild sunny days.

Watering. Water more freely as the days begin to lengthen.

MARCH

General. Bring in more bulbs for forcing. Divide Cannas and start into growth. Start Caladiums and Crinum into growth in heat. Prick out seedlings as they become large enough. Stake tall growing plants, fumigate or spray pot Roses if aphid is present. Shade plants from sudden bursts of bright sunshine.

Potting. Continue to pot on plants as they require it and pot up seedlings and rooted cuttings. Re-pot Orchids, e.g.,

Calanthes, as they begin to grow. Re-pot Cacti and Succulents if they need it. Pot up more Lilies.

Propagation.

(a) *Seeds.* Sow seeds of Annuals, Aralia, Cacti, Cascade Chrysanthemums, Rehmannia and several shrubs.

(b) *Vegetative.* Take cuttings of Abutilon, Coronilla, Cytisus, Echeveria, Euphorbia, Habrothamnus, Hydrangea, Panicum, Plumbago, Ruellia, Selaginella, Sparmannia, Streptosolen, Trachelium and other soft-wooded plants. Take leaf cuttings of Echeveria.

Pruning. Prune Bouvardias as they finish flowering.

Temperature. In the ordinary greenhouse maintain a night temperature of 45 deg. to 50 deg. F., and a day one of 55 deg. to 60 deg. F.

Ventilation. Ventilate as soon as the temperature reaches 65 deg. F.

Watering. Syringe plants, except those in flower, morning and evening.

APRIL

General. Bulbs which have flowered may be placed in a cold frame to harden off. Stand Roses outside after flowering. Prick out seedlings as they become large enough. Fumigate to destroy insect pests. Shade during the day.

Potting. Pot on or pot up plants as they need it. Re-pot Indian Azaleas and Camellias directly after flowering. Re-pot or top-dress Abutilons, Aloysias, Epacris, and ivy-leaved Pelargoniums.

Propagation.

(a) *Seeds.* Sow seeds of Cinerarias and any others mentioned for March.

(b) - *Vegetative.* Take cuttings of Achimenes, Epacris, Eranthemum, Euphorbia, Mimulus, Poinsettias, and other soft-wooded plants.

Temperature. As for March.

Ventilation. Open the ventilators early in the morning and shut down early in the afternoon.

Watering. Syringe plants, except those in flower. Start to water Cacti freely. Gradually withhold water from Freesias and Hippeastrums as they finish flowering.

MAY

General. Carnations, Cyclamen, Primulas and Arums may be stood outside in cold frames. Stand Chrysanthemums outside. Top-dress Lilies as they require it. Prick out seedlings. Stake and tie in plants as they need it. Shade plants from strong sunlight. Fumigate frequently to keep down insect pests. Any repainting can be started as soon as is convenient.

Potting. Summer flowering plants should be put into their final pots, also Chrysanthemums, by the middle of the month. Pot up rooted cuttings, and seedlings, and pot on plants that require it. Re-pot Cassias, Ericas and Acacias.

Propagation.

(a) *Seeds.* Sow seeds of Balsams, Calceolarias, Grevillea, Humeca elegans, Oxalis and Primulas.

(b) *Vegetative.* Take cuttings of Azaleas, Centradenia, Coleus thyrsoideus, Ericas, Pycnostachys and other soft-wooded plants.

Pruning. Cut back Acacias. Cut back Poinsettias, and start to grow in heat.

Temperature. As for April.

Ventilation. Ventilate freely, leaving a little air on at night in very mild weather.

Watering. Water freely. The floors should be damped down twice a day, and the staging and pots syringed to maintain a moist atmosphere.

JUNE

General. Gradually harden off forced shrubs and plant outside. Prick out seedlings when they are large enough. Dry off Tritonias, Nerines and Freesias. Fumigate or spray to get rid of aphides. Shade from sun. Make out seed list for plants to sow in the autumn.

Potting. Pot plants as they require it. Finish potting on chrysanthemums into finals.

Propagation.

(a) *Seeds.* Sow Gloxinias, Begonias, and Thunbergias, and any mentioned for May.

(b) *Vegetative.* Take cuttings of Acacias, Coronilla, Datura, Hydrangea, Thunbergia, Veronica, Crassula and other succulents. Layer Hoya and Malmaison Carnations. Side graft Camellias.

Pruning. Cut back Hydrangeas lightly to remove old flowering heads.

Temperature. Artificial heat will only be required in stove house. Cooler houses may need a little in cold or damp weather.

Ventilation. Allow plenty of air.

Watering. Water freely, twice a day if necessary in hot weather. Damp paths frequently, and syringe foliage plants. Cannas need plenty of water.

JULY

General. Stand pot Azaleas, Ericas, Camellias, Acacias, Hydrangeas and Rhododendrons outside in a sheltered spot. Stake and tie in Chrysanthemums and top-dress. Prick out seedlings. Top-dress Lilies again. Shade from sun. Fumigate and spray when necessary. Order bulbs for forcing. This is a good time to paint the inside of the houses as the plants may be stood outside.

Potting. Re-pot and start Freesias. Re-pot Cytisus and Coronilla and plunge outside. Pot plants as they need it. Perpetual Carnations should go into their final pots.

Propagation.

(a) *Seeds.* Sow Mignonette and Nicotiana for winter flowering. Sow Salpiglossis and Stocks for spring flowering. Sow Freesias and Nierembergias.

(b) *Vegetative.* Take cuttings of Abutilons, Calceolarias, Ixoras and any mentioned last month. Bud Orange and Lemon trees.

Pruning. Cut back Coronilla, Cytisus, Nierembergias and show Pelargoniums.

Temperature. As for June.

Ventilation. Give plenty of air, leaving a little on at night.

Watering. Water freely and keep the atmosphere moist, especially where ferns and foliage plants are grown.

AUGUST

General. Prick out seedlings. Finish top dressing Chrysanthemums, and tie in and disbud. Remove buds from winter flowering Pelargoniums. Keep houses well shaded.

Potting. Re-pot Arums and Cyclamen. Pot plants as they require it, Primulas should be ready for their final pots. Start to pot up early flowering bulbs, such as Roman Hyacinths, etc.

Propagation.

(a) *Seeds.* Sow seeds of Annuals for spring flowering and Cyclamen.

(b) *Vegetative.* Take cuttings of Aloysia, Begonias, Eupatorium, Fuchsias, Heliotrope, Panicum, Petunias, Pelargoniums, Pilea, Salvias, Selaginella, Trachelium, and any other softwooded plants which are available.

Temperature. As for July.

Ventilation. As for July.

Watering. As for July. Syringe plants standing outside each evening during hot weather.

SEPTEMBER

General. Bring inside and top-dress Azaleas, Ericas, Camellias, etc. Bring in Chrysanthemums, winter-flowering Pelargoniums and Salvias. Continue to tie in and disbud Chrysanthemums. Prick out seedlings. Stake those plants which need it. Less shading will be required and temporary shading may be washed off at the end of the month.

Potting. Pot up bulbs including some Lilies. Pot up Malmaison Carnation layers and take inside. Pot plants which require it, Cinerarias should go into their final pots.

Propagation.

(a) *Seeds.* Sow more Annuals.

(b) *Vegetative.* Take cuttings of Crotons, Fittonia, Saint-paulia and Tradescantia.

Pruning. Prune hard-wooded climbers as they finish flowering, e.g., Streptosolen, Plumbago, etc.

Temperature. Maintain a night temperature of 45 deg. F. in the ordinary greenhouse. Some artificial heat will be required at night.

Ventilation. Ventilate freely during the middle of the day, but give none at night, except during mild weather.

Watering. Water less and keep atmosphere drier. Syringe and sponge all foliage plants.

OCTOBER

General. Bring into house Cinerarias, Cyclamen and Primulas. Store Caladiums and Gloxinias on their sides under the staging when they have dried off. Store tuberous Begonias, Cannas and Lilies in a frost-proof shed. Disbud Carnations. Top dress annuals and pinch back to encourage bushy growth. Prick off seedlings. Stake plants where necessary. Fumigate and wash glass on the inside. Remove all shading. Overhaul the heating apparatus.

Potting. Re-pot Roses and stand outside. Finish potting up bulbs. Pot up Dielytra and stand in a cold frame. Pot plants which need it.

Propagation.

(a) *Seeds.* Sow seeds of Celsia for summer flowering.

(b) *Vegetative.* Take cuttings of foliage plants.

Pruning. Prune Oleanders and pot Roses. Continue to prune climbers.

Temperature. Maintain in the greenhouse a night temperature of 40 deg. to 45 deg. F. and a day one of 55 deg. F.

Ventilation. Give a little air in the late morning and early afternoon on sunny days.

Watering. Water sparingly. Gradually withhold water from tuberous Begonias, Gloxinias, Lilies and Oleanders. No syringing is necessary in the greenhouse.

NOVEMBER

General. Top-dress Clivias and move into a warm house. Prick out seedlings. Start to force earliest bulbs. Bring in Hydrangeas. Stake plants which need it. Scrub woodwork and paint pipes if necessary. Clean the glass on the outside of the houses. Wash all empty pots, etc.

Potting. Re-pot Lilies and put in cold frame until growth starts. Re-pot, if necessary, and start Hippeastrums. Pot plants which require it.

Propagation. *Vegetative.* Start to take cuttings of Carnations and Chrysanthemums.

Pruning. Finish pruning Datura, Oleander, Plumbago and other climbers.

Temperature. In the greenhouse maintain a night temperature of 40 deg. to 45 deg. F., and a day one of 50 deg. to 55 deg. F.

Ventilation. Admit air only when the sun is shining.

Watering. Water sparingly. Cacti and succulents should be kept dry. Very little syringing is necessary in the stove house.

DECEMBER

General. Bring in more bulbs for forcing. Start to force Hydrangeas and early-flowering shrubs. Cut down Chrysanthemums which have flowered and stand pots in frames. Thin and top-dress annuals in pots and stake where necessary. Fumigate where aphides are present. Remove dead leaves and flowers. Paint staging if necessary.

Potting. Pot up Lily bulbs. Pot plants where necessary.

Propagation. *Vegetative.* Continue to take Carnation and Chrysanthemum cuttings.

Temperature. As for November.

Ventilation. Give a little air whenever possible.

Watering. Water cautiously. Syringe very little in the stove house.

CHAPTER XIX

PESTS AND DISEASES

I want to know

1. Can diseases be cured ?
2. How can I kill mealy bug ?
3. What is the insecticide that kills white fly ?
4. What "damping off" means ?
5. If Paris Green really will kill woodlice ?
6. About watering and mildew ?

NATURALLY before discussing the control of individual pests and diseases some mention must be made first of all of what may be called Greenhouse Hygiene. Every year hundreds of plants are lost merely because of uncleanness in the greenhouse. It is important, therefore, to see that the inside of the house is washed down at least once a year with cresylic acid, using 1 pint of this chemical to 12 gallons of water and stirring in 1½ ounces of Estol H, a liquid spreader which you can use instead of soft soap. If you can take the plants out of the house for a day or two you could give the inside a really good spraying.

Then much can be done with the more permanent crops like vines and peaches, by fumigation in the winter. Fumigation is also useful in the spring and summer to control certain pests, like the white fly on tomatoes, and the simplest way of doing this is to use a proprietary cyanide powder such as Cyanogas or Cyandie. These should be used in accordance with instructions given on the tins but it means sprinkling ¼ ounce of the powder along the floor of the house for every 1,000 ft. of cubic capacity. You can easily work the cubic capacity out by multiplying the length by the width in feet and then taking the height to the ridge of the house and the height to the gutter

in feet and dividing it by two, and finally multiplying the square ft. already obtained, by this figure, e.g.

Length of house 18 ft.

Width of house 12 ft.

Multiply the two together and you get 216 sq. ft.

Height to gutter 6 ft.

Height to ridge 10 ft.

Add the two together and you get 16 ft.

Divide by 2 and you get 8 ft.

Now multiply the 216 sq. ft. by 8.

Final result equals 1,728 cubic ft.

It is most important to have a damp floor, but the leaves of the plants concerned dry, when fumigating in summer and it is equally important to open the house up very early in the morning before the sunshine gets on to the plants. However when you buy the special cyanide powder you will, as I have already said, be careful to follow the instructions on the packet.

SPREADERS

We used to use soft soap to cause a wash to spread more evenly and to help a nicotine wash to be more effective but latterly there have been introduced excellent substitutes and I can recommend sulphonated lorol and Estol H. If readers have any difficulty in getting these they have only to write to me.

BAITS

In the tabulated information that follows on pages 317 and 320 certain control measures will be given as baits especially those in connection with wood lice, surface caterpillars, and slugs. Generally speaking it is a good plan to place baits on the ground in the evening because much of the damage is done at night-time. When it is impossible to get bran to use as a carrier of the killing agent, semi-dry tea leaves from the tea-pot can be used instead or dry lawn mowings. Some people use bone meal or even dried blood—the former being the better alternative than the latter.

STERILIZATION

When crops have been grown in the same house year after year, yields tend to decrease and then soil sterilization has to be carried out. In commercial greenhouses this has to be done by means of heating the soil with steam to a temperature of 212 deg. F. The lasting effect of efficient steaming is about three years.

With smaller growers a 2 per cent. solution of formaldehyde is used instead, the aim being to wet every part of the soil. As the ground is dug over the bottom of the trench is flooded with the formaldehyde as well as the top spade's depth. In this way you sterilize the top 18 ins. of soil. Formaldehyde is excellent against soil diseases but is not so useful against soil pests. When the latter are very prevalent a 1 per cent. solution of cresylic acid may be used instead but this should only be used once every three or four years at the most.

When soil disinfecting chemicals are used it is necessary to leave the soil for a month after treatment and then to fork the ground over thoroughly two or three times at intervals of four days to let out the fumes. No planting should be done until all fumes have disappeared.

When using soil for pots or boxes it is a good plan to sterilize it beforehand, and this can be done by heating the soil to 212 deg. F. and keeping it at this temperature for about 15 minutes. Small quantities of soil may be put in a biscuit tin for instance in an oven, while larger quantities may be sterilized by filling a large bucket full of soil and hanging it from a crossbar into a copper of boiling water in such a manner that the water cannot boil over into the bucket. It is often convenient to use the copper at the end of a day's washing for this purpose. The object—may I remind the reader—is again to get the soil heated to 212 deg. F. and to keep it at this temperature for 15 minutes. It is advisable, therefore, to immerse a reliable thermometer into the centre of the soil about 3 ins. down so as to be certain of results. A rough guide can be made if a potato the size of a hen's egg is buried 1 in. down in the bucket. When this is cooked the soil will have been properly treated.

Treating soil in this way by heat kills off weed seeds, soil insects, disease organisms such as damping off and verticillium wilt.

RECIPES

- (A) A Poison Spray.
For use against Caterpillars and the like.
 $\frac{3}{4}$ lb. arsenate of lead paste.
 $\frac{1}{4}$ oz. Estol H.
 12 gallons water.
- (B) A Contact Spray.
For use against Thrips and Red Mites (commonly called red spider).
 1 oz. liquid nicotine.
 1 pint white petroleum oil spray.
 10 gallons water.
- (C) Bait.
For use against Woodlice.
 $\frac{1}{4}$ lb. Paris Green.
 14 lbs. dried blood.
 Use at 1 oz. to the sq. yd.
- (D) A Contact Spray.
For use against Aphides, White Fly, etc.
 1 oz. liquid nicotine.
 1 oz. Estol H.
 10 gallons of water.
- (E) Partial Sterilizer,
For watering soil not sterilized and where damping-off is seen.
 Cheshunt Compound, obtained as such from any chemist or Horticultural Sundriesman.
- (F) Fumigation.
 Summer: Against White Fly, etc.
 $\frac{1}{4}$ oz. "Cyandie" or "Cyanogas," 1,000 cubic ft.
 Winter: Against Mealy Bug, etc. For Vines, etc.
 $\frac{1}{2}$ oz. Cyandie or Cyanogas per 1,000 cubic ft.

PEST AND DISEASE TABLE

PLANT ATTACKED	PEST OR DISEASE	PART OF PLANT ATTACKED	METHOD OF CONTROL
Beans... ..	Aphides	Leaves and growing points	Spray with nicotine.
	Red Mites (Red Spiders)	Leaves	Syringe under surface of leaves with clean water each day.
	White Fly	Leaves	Fumigate with Cyanogas.
Cucumbers	Aphides (Green Fly)	Leaves	Spray with nicotine.
	Red Mites (Red Spiders)	Underside of leaves	Spray with petroleum white oil and nicotine.
	Thrips	Undersides of leaves	Spray with nicotine.
	Woodlice	Eats roots and stems	Bran and Paris Green bait.
	Stem Rot or Canker.	Stem at soil level	Dust round stem with equal parts of flowers of sulphur and hydra- ted lime.
	Leaf Spot	Leaves,	Grow immune variety, Butcher's.
	Leaf Spot	Fruits	Destroy infected cu- cumber, reduce moist- ure.
	Mildew	Leaves	Dust with sulphur dust.
Figs	Verticillium wilt	Roots	Raise temperature of house. Shade outside.
	Mealy Bug	Leaves and shoots	Petroleum oil emul- sion and nicotine.
	Red Spider	Leaves and shoots	Petroleum oil emul- sion and nicotine.
	White Fly	Leaves and shoots	Fumigate with Cyan- ogas.
	Thrips	Leaves and shoots	Spray with nicotine
Grapes ..	Mealy Bug	Wood, leaves, fruit	Fumigate with Cyan- ogas in winter. Brush infected parts neat
	White Fly	Leaves and fruit	Liquid Derris in sum- mer. Fumigate with Cyan- ogas.

PLANT ATTACKED	PEST OR DISEASE	PART OF PLANT ATTACKED	METHOD OF CONTROL
Grapes— <i>continued</i>	Scale	Rods, young wood	Wash down 3% tar oil in winter.
	Red Spider	Leaves	Spray summer petroleum white oil.
	Mildew	Leaves and fruits	Flood border well in winter. Avoid extremes of temperature.
			Dust with sulphur dust.
Lettuce ..	Aphides (Green Fly)	Leaves	Spray nicotine.
	Root Maggot	Root	Dig up infected plants and burn. Water soil after Mercuric Chloride 1 oz. to 12 gals. of water.
	Slugs	Leaves	Bait with bran and powdered Meta.
	Woodlice	Leaves	Bait with dried blood and Paris Green.
	Botrytis	Leaves and collar	Pick off diseased leaves and burn.
Marrows ..	Mildew	Leaves	Avoid draughts.
	Aphides (Green Fly)	Leaves	Spray nicotine.
	Red Spider	Leaves	Cut off infected areas and burn.
	Virus diseases	Leaves	Pull up and burn infected plants.
	Aphides	Leaves	Spray nicotine.
Melons ..	White Fly	Leaves	Fumigate Cyanogas.
	Red Spider	Leaves	Spray petroleum white oil.
	Thrips	Leaves	Spray nicotine.
	Woodlice	Roots and stems	Blood and Paris Green bait.
	Collar-Rot	Stem at soil level	Never allow damp to remain round stem.
Peaches ..	Wilt	Foliage	Shade outside. Raise soil temperature.
	Aphides (Green or black)	Leaves	Spray with nicotine.
	Scale	Branches and shoots	Spray petroleum white oil.
	Mildew	Leaves	Dust with good sulphur dust.

PLANT ATTACKED	PEST OR DISEASE	PART OF PLANT ATTACKED	METHOD OF CONTROL
Strawberries	Aphides	Leaves	Spray with nicotine. Dip plants in 1% lime sulphur before planting.
	Red Spider	Leaves	
	Mildew	Leaves and fruit	Dust sulphur dust. Avoid extremes of temperature.
	Aphides Caterpillars White Fly Damping-off	Leaves Leaves Leaves Seedlings	Spray nicotine. Spray arsenate of lead. Fumigate Cyanogas. Use sterilized soil or water with Cheshunt Compound.
Tomatoes	Verticillium wilt	Roots	Mulch soil with damped peat. Raise temperature; syringe overhead. Shade outside.
	Mildew (Cladosporium)	Leaves	Good ventilation. Spray with colloidal copper. Grow resistant varieties.
	Buck Eye Rot	Fruits	Avoid splashing tomatoes with water. Mulch surface of ground with straw
	Blossom End Rot Blotchy Ripening	Fruit Fruits	Water regularly. More potash; shade outside.

SPECIAL NOTES

Wireworm. It is possible to get rid of wireworms by making holes 2 ft. apart with a crowbar or walking stick 9 ins. deep and dropping into the bottom of each hole a piece of para-di-chlor-benzine the size of a French bean. The hole should be filled up immediately afterwards.

Slugs. The best bait for slugs consists of powdered meta fuel (metaldehyde) mixed with bran, semi-dry tea leaves or lawn mowings. You need $\frac{1}{2}$ oz. of the powder to a handful of the material and you put heaps the size of an eggcup every 2 or 3 ft. among the plants.

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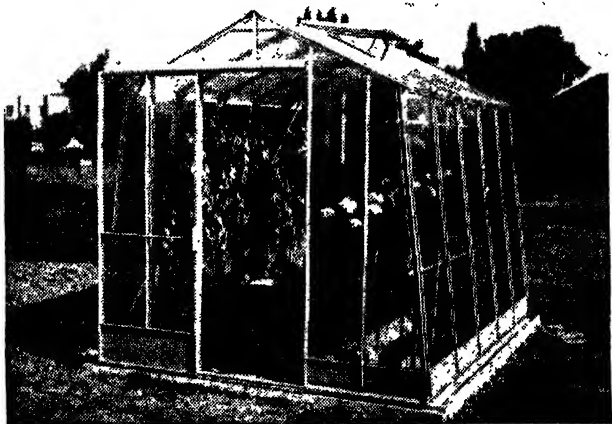
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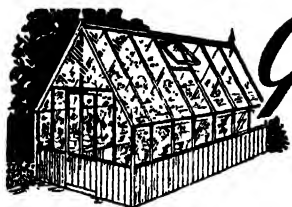
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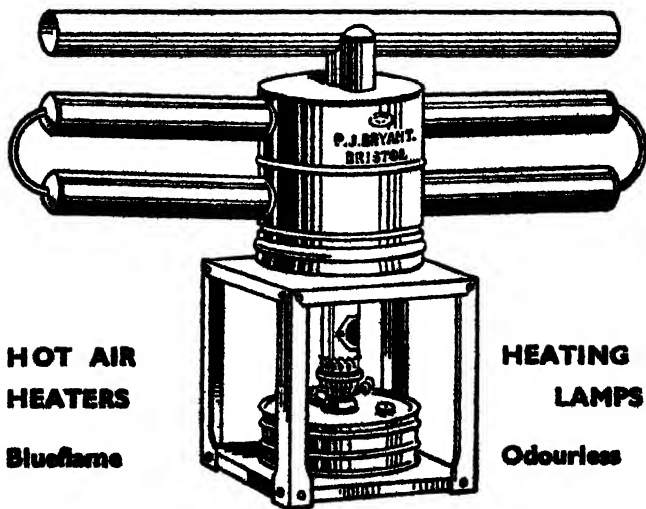
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